

# The Semantics of the Future

by

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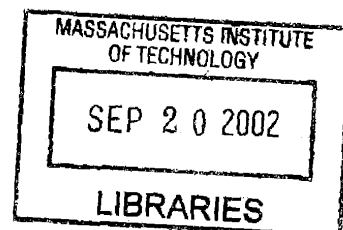
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## **ABSTRACT**

Natural languages use a number of different methods to refer to future eventualities: among them are futurates, as in (1a), and futures, as in (1b) and (1c).

- (1) a. The Red Sox (are) play(ing) the Yankees tomorrow.
- b. We'll change your oil in Madera.
- c. We're going to change your oil in Madera.

This dissertation uses evidence primarily from English, with additional data from Turkish and Indonesian, to argue that these methods all involve universal quantification over subsets of metaphysically accessible futures.

One factor in determining which worlds a modal quantifies over is the temporal argument of the modal's accessibility relation. It is well-known that a higher tense affects the accessibility relation of modals. What is not well-known is that there are aspectual operators high enough to affect the accessibility relation of modals. New data presented in this dissertation reveal the presence of aspectual operators located between TP and the future modal projection. The effects of these operators on truth and assertability conditions provide substantial information about the correct characterization of future modality, and indeed of modality in general. Furthermore, the very existence of such aspectual operators raises questions about how aspect is represented in the semantics, if (as is generally assumed) aspectual operators take event arguments, which do not occur outside of the verb phrase.

Thesis Supervisor: Sabine Iatridou  
Title: Professor of Linguistics

## Acknowledgments

On my family's very first computer, a Tandy TRS-80 that we got in 1982, there was a program called "dissertation." When you typed in RUN DISSERTATION, the screen would scroll a lot of gobbledegook that could only be stopped by hitting the BREAK key. I thought this was fascinating. It was second only to making the computer sound like it was falling down the stairs by typing individual letters into the primitive speech synthesis program, another favorite pastime. But the result of this was that for a number of years I thought that the word *dissertation* actually meant 'a lot of gobbledegook'. I see now that I was not entirely wrong. But to the extent that any part of this particular dissertation fails to be gobbledegook, the following people are to thank.

I have been lucky to have had Sabine Iatridou as my committee chair. She is blessed with stunningly precise aspectual and modal intuitions, and a great gift for making them all lie flat. She has consistently militated against gobbledegook in my thinking and in my prose. She has encouraged me to trust my instincts. More than anything, throughout this process she constantly and vociferously expressed her belief in me, in a tone that brooked no dissent.

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Joseph 'Jofish' Kaye, Becky Marshall, and Elena Guerzoni all lent me their editorial expertise on part or all of the text, for which I am grateful (you should be too).

This dissertation would have been quite short without data. I have been lucky enough to work with many astute consultants, both linguists and non-linguists. By language, they are: Eric Albert, Joseph "Jofish" Kaye, Sharon Teitlebaum, and too many speakers at MIT to thank here (English); Sabine Iatridou (Greek); Wendy Ham, Yonathan Thio, Diana Yuliyanti, and Natanael Perangin (Indonesian); Ken Hiraiwa, Toshiyaki Inada, Shinichiro Ishihara, Kimiko Nakanishi, Shigeru Miyagawa, and Shogo Suzuki (Japanese, and while we're on the topic I'd like to thank my Japanese teachers, senseis Nagaya, Yamamoto, Ikei, and Hatano); and Meltem Kelepir and Gülsat Aygen (Turkish).

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*To the memory and legacy of Ken Hale*

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# Chapter 1

## Introduction

So far, then, as I have anything that you could call a philosophical creed, its first article is this: I believe in the reality of the distinction between past, present, and future. I believe that what we see as a progress of events *is* a progress of events, a *coming to pass* of one thing after another, and not just a timeless tapestry with everything stuck there for good and all.

-Arthur Prior  
“Some free thinking about time,” about 1958

Those who say that there is no time like the present are quite correct; the present is indeed a very special time. It has the distinction of being the only time graced by our presence, effectively dividing the timeline in two. On one side of the divide are times that have, in a sense, happened to us, and on the other side are times that, in the same sense, have not yet happened to us. We speak quite frequently about this other side, the future, using sentences that convey varying shades of certainty and uncertainty.

At first glance, it is not too puzzling why we would speak of the future with uncertainty. What is more puzzling is how we speak of it with as much confidence as we do. The topic of this dissertation is the meaning of those sentences which express a high degree of certainty about the future, such as the expressions in (2):

- (2) a. The Red Sox are playing the Yankees tomorrow.
- b. The Red Sox play the Yankees tomorrow.
- c. We’re going to change your oil in Madera.
- d. We’ll change your oil in Madera.

As befits the topic, I will be speaking with varying degrees of certainty and uncertainty. One of the more certain results is that future reference in the languages studied involves metaphysical modality — also referred to as a branching future — quantification over worlds that are identical with the actual world up to and including the present (Thomason, 1970).

Two themes arise to justify this certainty: The first has to do with who or what controls the future. We will find that the constructions we will be examining presuppose that someone, or something, determines what happens in the future. We will call this entity a “director.” There are commitments of animate directors, and of the world in general, that are presupposed to render an outcome inevitable. As we will discuss below, the semantics of commitment requires modality.

The second theme has to do with how aspectual properties affect the proposition expressed about the future. In order for the denotations to work out correctly, there must be a modal element to the future reference; the modality associated with commitment does nicely.

This research touches on an age-old debate about whether there is one future, and we are just uncertain about what happens in it, or whether there is no single future, and speaking of the future necessarily involves reference to branching future possibilities rather than future actualities. Oddly enough, even though there is ample evidence for the latter, it turns out that the constructions in question quantify only over worlds that are presupposed to agree with the future — those that agree with the commitments of the presupposed director. In no sense do these constructions make assertions about all metaphysically accessible worlds. All the evidence pointing to modality in futures and futurates only bears on the commitment modality. Where we need to refer to the “real” future in the semantics, there is no evidence bearing on the question of whether it is a single future or a branching future. I will present some suggestive evidence that the branching future is the correct idea, but it is hardly conclusive.

The data studied is primarily English, though cross-linguistic similarities and differences in several languages (Greek, Indonesian, Turkish, etc.) are pointed out. The similarities are striking, and the hypothesis is that they may indicate universal properties. These interest us inasmuch as they reveal properties of the human language faculty and its interface with the cognitive-perceptual system; thus this research can be considered a part of the Minimalist Program (Chomsky, 1993, 1995, 2000, 2001) However, it is far from a comprehensive survey,

and there are languages that may provide counterexamples, so the hypothesis of universality in this domain will have to remain a hypothesis for now.

Before getting to the details of the project, I would like to present some background. There are a number of formalisms designed for issues of tense, aspect, and modality in general. These tools are set out in section 1.1. Section 1.2 is an overview of the dissertation.

## 1.1 Tools

The semantics practiced in this dissertation is of the compositional kind, in which it is assumed that the meaning of a sentence depends on the meaningful parts of the sentence and how they are put together.<sup>1</sup> Here I briefly introduce some of the formal tools I will be using in constructing a compositional theory of the future-referring constructions in question. For a more detailed introduction, the reader is referred to the sources cited below.

### 1.1.1 Syntactic assumptions

I assume a minimalist, Minimalist syntax. That is, my assumptions are inherited from the Minimalist Program, but are intended to be easily portable to any other syntactic framework; nothing will hinge on Minimalism per se.

### 1.1.2 The intensional system

However one represents the future formally, one cannot avoid making some kind of reference to times. As I mentioned above, I will also provide evidence that modality is a necessary part of the meaning of the future constructions under investigation; therefore worlds are required in our system as well. The intensional system we will use to incorporate worlds and times into the semantics is based on the extensional framework of Heim and Kratzer (1998). As usual, there is a valuation function “ $\llbracket \cdot \rrbracket^g$ ” that takes a morphosyntactic object and a variable assignment  $g$ , and returns a denotation. Times are type  $i$ , variables  $t$ ,  $t'$ , etc; worlds are type  $w$ , variables  $w$ ,  $w'$ , et cetera. For convenience more than anything else, I will treat these variables as being part of the object language, appearing in the

---

<sup>1</sup>And, of course, context, though we will not be touching on contextual influences very much in what follows.

compositional structure, and speak of a “time  $t$ ” rather than a “time assigned to  $t$  by the variable assignment  $g$ .” Truth values are type  $t$ , and propositions are type  $\langle w, \langle i, t \rangle \rangle$ .<sup>2</sup> A  $vP$  or larger phrase whose denotation is a proposition is expressed by an italicized letter ( $p$ ,  $q$ , etc.), and its denotation is expressed by the same letter not italicized ( $p$ ,  $q$ , etc.).

I will assume the  $vP$ -internal subject hypothesis (Koopman and Sportiche, 1991; Kitagawa, 1986; Fukui and Speas, 1986; Kuroda, 1988), and ignore movement of the subject out of the  $vP$ ; eschewing this and other movements will enable us to forgo discussion of mechanisms for movement, changing of variable assignments, and so forth. I will do this even though it will become clear that agents are especially important entities. Their movements may be relevant, but they are beyond the scope of this work.

### 1.1.3 Tense, aspect, Aktionsart, and temporal adverbials

The terminology of temporal and aspectual semantics is somewhat forbidding. There is an inherited set of terms from traditional grammar and intuitive notions (“imperfective,” “aorist,” “past,” “event,” e.g.) and often some confusion about whether a term is to refer to a piece of morphology (whatever its meaning), or a piece of meaning, or a particular reading of a sentence. In addition, because there is not yet agreement in the field on what the primitives are and how they should be defined, there is a danger of misunderstanding if we leap in without making explicit the definitions and assumptions to be used.

So let us try to do so here. First, let us consider times. I assume that the timeline is dense; in general, times are not indivisible points, i.e., instants, but rather, intervals that can be divided into ever-smaller subintervals. The times that are referred to by variables in our system are thus intervals, not instants. The sole exception to this principle might be that the present, which I will refer to as *now*, is an instant. I will remain agnostic on this question.

Functions that take temporal arguments are denoted in several ways. If they are associated with a piece of overt morphology, they can be denoted as usual as the result of applying the evaluation function  $\llbracket \cdot \rrbracket^g$  to the morphology. So the meaning of the progressive *be -ing* can

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<sup>2</sup>I agree with Stalnaker (e.g.) that a sentence does not denote a proposition itself, but rather a function from contexts of utterance into propositions. But since the influence of context on “what is said” will be of little relevance to us, I will gloss over this role of context. This is not to say that the context is unimportant; the truth or falsity of a given sentence in a given context is, indeed, a most important means by which we can determine what is said. In the cases we will be studying, however, what is said will not change much from context to context.

be written as  $\llbracket be -ing \rrbracket^g$ . But because temporal predicates are prone to having allomorphs, going unpronounced, and (like *be- ing*) being subject to affix hopping (Chomsky, 1957), it will be convenient to write a name for that function in small caps: PAST, PROG, and so on. And as I said earlier, the meaning of a proposition  $p$  will generally be written as  $p$ , though it could also be written as  $\llbracket p \rrbracket^g$ .

I will assume that morphemes associated with times are generally operators; they existentially bind a time, instead of taking a temporal pronoun as an argument, as in Partee (1984); von Stechow (1995); Kratzer (1998). Nothing in particular hangs on this assumption, however.

Throughout this dissertation I will skirt many of the issues surrounding the introduction of event arguments into the structure. I believe that in this case it is worth forgoing the many advantages of using event arguments (Davidson, 1997), in order to keep the exposition as simple as possible. This system could be altered to use event variables without too much trouble; the one trouble that would arise is interesting, and is discussed in part below. I will, however, speak informally of events.

I will consider  $v$ Ps, which in an event-based semantics might be a predicate of events, to “describe an eventuality,” (where *eventuality* is a cover term for events and states) despite the fact that in the formal system we will be using, they do nothing of the sort, being of type  $\langle w, \langle i, t \rangle \rangle$ .  $v$ Ps can be (*lexical*) *statives* or *eventives*.

I will use the phrase *tense morpheme* or *temporal morpheme* to refer to those morphemes (or lack thereof) whose meaning yields either past or present temporal location of the eventuality. *Aspect* or *aspectual morpheme* will refer to morphemes associated with temporal properties other than location; these properties are *aspectual properties*.

One aspectual property which turns out to be significant to the study of future constructions is Dowty’s (1979) *subinterval property*. A predicate  $p$  of times has the subinterval property if and only if for all times  $t$ , for all subintervals  $t'$  of  $t$ , the truth of  $p(t)$  entails the truth of  $p(t')$ . Thus a proposition with a lexical stative such as  $\llbracket John\ be\ here \rrbracket^g$  in a particular context has the subinterval property, since John’s being here over an interval  $t$  entails that  $\llbracket John\ be\ here \rrbracket^g$  in the context is true at all subintervals of  $t$ . If  $\llbracket John\ bake\ a\ cake \rrbracket^g$ , on the other hand, is true of an interval  $t$ , it is not true of all the subintervals  $t'$  of  $t$  that  $\llbracket John\ bake\ a\ cake \rrbracket^g$  is true at  $t'$ .

The subinterval property survives as a property of predicates of events in Krifka’s *cumu-*



*lativity* property (Krifka, 1998). Indeed, recent theories of aspect most often take aspectual morphemes to have denotations that take event arguments, not temporal arguments. This move has been very useful in explaining, for instance, the influence of objects on aspectual properties, and I would not argue with those results. One point I will make, however, is that we must be very careful about whether we want to treat the subinterval property as a property of predicates of events, simply because it turns out to be relevant to predicates — namely, modals — that could not possibly be predicates of events. We will see examples of this phenomenon throughout the dissertation. Of course, the simplest way to avoid this problem is to take events out of the picture, and retain Dowty’s original conception of the subinterval property as a property of predicates of times, even though we lose the explanatory power that event arguments afford for other data.

Note that once we make this move, there is in principle no reason to exclude predicates of times that are not verb phrases: tenses, quantifiers over times, and so on. It will turn out to be useful, in fact, to include them in the set of predicates that can have the subinterval property. For now, here is some evidence that it is at least not problematic. Consider the well-known fact that the sentence in (3) cannot have the gloss given.

- (3)    Zoe builds a tower.  
       \*‘Zoe is building a tower.’

Eventives such as *leave* cannot hold of the present, while lexical and derived statives (progressives and generics), as in (4), can do so. We can verify independently that these latter predicates have the subinterval property; in all cases, for any interval that the predicate holds of, it also holds of any subinterval of that interval.

- |     |    |                                    |                 |
|-----|----|------------------------------------|-----------------|
| (4) | a. | Zoe is asleep.                     | lexical stative |
|     | b. | Zoe is building a tower.           | progressive     |
|     | c. | Zoe builds a tower each afternoon. | generic         |

Let’s abbreviate “subinterval property” as “SIP”, and assume that the grammar can somehow tell whether a predicate is +SIP or -SIP (this is where a theory similar to Krifka’s, but for times, would be quite useful, but let us simply assume that it could be done). Then we might rule out -SIP predication of *now* as follows:

- (5) Present -SIP constraint: for all worlds  $w$ , for all predicates  $p$  of times,  $p(w)(now)$  is undefined.

Constraints like this one have been proposed in many different discussions of this effect. However, it is not typically mentioned in such discussions that past tense sentences behave like the lexical and derived statives in this respect. The past tense morpheme can take *now* as an argument; *now* is the time that the eventuality is asserted to precede.

- (6) Zoe built a tower.

If we consider the subinterval property as Dowty states it, it is clear that past tense phrases have the subinterval property. Suppose that it is true throughout today that Zoe built a tower. Then it is true at any part of today that Zoe built a tower. Thus treating the subinterval property as a property of *any* predicate of times, including PAST, does not contradict the present -SIP constraint. In the following chapters, we will see where the extension of the subinterval property to predicates such as tenses is not only harmless, but useful.

One final note about formal tools for tense and aspect. Another piece of technical machinery that I will not be using is the situation (Barwise and Perry, 1983; Kratzer, 1989), which is, intuitively, a part of a world. Again, this omission is made chiefly for the goal of simplicity of exposition, not because of any failing of situational theories. There are two ways in which situations may in fact be the best way to account for the facts that I will be presenting. The first is that situation arguments are more plausible as arguments of modals than are event arguments, and therefore might be a good compromise between an event-based subinterval property and a time-based subinterval property. The second is that they are very useful in explaining certain properties of generics; a generic is taken (as in Chierchia (1995), e.g.) to involve universal quantification over situations. Facts about, e.g., the interpretations of indefinites are thereby accounted for. Although I will call upon indefinite interpretation data to show whether a certain quantifier is universal in force, in the formal system I will leave these quantifiers as quantifiers over times, with the understanding that situational quantification is really what is going on.

### 1.1.4 Talking about times

Earlier research into tense and aspect has provided us with a dazzling number of metalinguistic terms for times: for example, Event Time, Reference Time, and Speech Time; or Time of Situation, Time of Topic, and Time of Speech, to pick on Reichenbach's and Klein's systems (Reichenbach, 1947; Klein, 1997), and they are not the only ones with systems. Unfortunately, such terms are often used in different ways by different writers. Furthermore, in the current project we will actually need more times than the usual three. We could avoid naming them altogether, and speak only in formalisms, but we would miss some important generalizations that way, and give ourselves headaches as well. So it looks like we should create new names for the times we will be interested in. On the other hand, I am sympathetic to the plight of the reader; it is often dismaying to find that one has to memorize a whole new set of unfamiliar names for familiar times in order to read someone's work.

So, being conscious of the need to have unambiguous reference to several different times, yet not wishing to create out of whole cloth a new set of names for my readers to commit to memory, I will refer to times according to their position in the sentence. We can view a time either as input or output of a function, or as input to or output of (a function in) a particular location in the structure. A time in any particular sentence will thus often have four (!) names: as the output of a function, the input of a function, and the input or output of (a function in) a particular location in structure. The redundancy is desirable, as we will see. Some generalizations will benefit from reference to relationships between times and lexical items, and some will benefit from reference to relationships between times and syntax. The hope is that this nomenclature will be as transparent as possible, and will not require great feats of lexical access on the part of the reader.

Consider then a piece of morphology whose denotation is a function that requires at least a time and a proposition in order to be completely saturated, and which either existentially binds a different time, or introduces an unbound time, such that the proposition is applied to that different time. Here is such a function.

$$(7) \quad \lambda p.\lambda w.\lambda t. \exists t'[t' < t \ \& \ p(w)(t')]$$

The input (temporally speaking) of this function is  $t$ ; the other time,  $t'$ , we will call the output. Since this particular function has the name PAST, we would call  $t$  the PAST input

and  $t'$  the PAST output.<sup>3</sup>

If PAST is sitting in T, we could also call  $t$  the TP input (assuming there is nothing in the specifier of TP that affects the time). If it is somewhere different, say, in C,  $t$  is not the TP input but the CP input. It would still, of course, be the PAST input.

I will occasionally also speak of worlds in this way as well.

Finally, I have found it impossible to avoid reference in the text to the time over which an eventuality happens. I am on the side of those who argue that this time is not represented in the object language, and yet in the metalanguage it is quite useful to be able to talk about it.<sup>4</sup> Something intuitive is really called for here. I will throw up my hands here and follow the event grammar convention of calling it run time (though I mean this term to apply to the time over which a state holds as well).

### 1.1.5 Modality

In addition to times, we also need to consider how to deal with worlds. I will assume that Kratzer (1991) is essentially correct about the meaning of modals; that they are quantifiers over worlds. Kratzer's theory abstracts away from the temporal dimension (as do the modal logics upon which her theory is based); let's take a look before attempting worlds and times together.

There are two components in Kratzer's theory that determine the set of worlds to be quantified over in any particular case: the modal base, and the ordering source.

#### 1.1.5.1 The modal base

It is clear that one modal can have several different meanings. For example, the sentence in (8) has two readings, one in which the speaker is deducing from the available facts that Eric is at home, and one in which the speaker is expressing a normative statement; Eric must be home according to some set of rules, or the like.

- (8) Eric must be at home.

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<sup>3</sup>We will not worry about the valuation function too much in this nomenclature. PAST is indeed a function, but *woll*, for example, is a piece of object language; the corresponding function is  $\llbracket woll \rrbracket^g$ . Nonetheless we will talk about inputs to and outputs from *woll*.

<sup>4</sup>This interval could be referred to as the verb input, but with futurates (chapter 2) this becomes problematic; is the input to the verb the time of the plan or the time the eventuality is to happen?

In both of these readings, the force of the quantification is universal, but there is still a difference. For Kratzer, this difference is that the readings involve quantification over different sets of worlds.

To determine which set of worlds the modal quantifies over, Kratzer invokes sets of propositions called *conversational backgrounds*. Propositions are sets of worlds, so a conversational background is a set of sets of worlds. The intersection of the sets of worlds is the set over which the modal quantifies. The worlds in that set, the *modal base*, can also be thought of as the worlds in which all the propositions in the conversational background are true. In any case, these are called the *accessible* worlds, with respect to a particular conversational background; the conversational background is said to provide an *accessibility relation*.

Among the modals Kratzer considers, are two modal bases: the *circumstantial* bases and the *epistemic* bases. A circumstantial base is a set of facts about the actual world. The circumstantial base that will interest us the most is what Kratzer calls a totally realistic circumstantial base: one that includes all the propositions that are true in the actual world. Taking a cue from Thomason (1970), (discussed below), let's use a shorter name for this modal base: the *metaphysical* base. The epistemic base, on the other hand, includes only the propositions that are known (by someone) about the actual world.

It is easy enough to distinguish these two modal bases, as long as time is not an issue. Suppose we consider a slice of a world at which Delaney is at home but Mike doesn't know it. Then the set of metaphysically accessibly (i.e., totally realistically circumstantially accessible) worlds would not contain any worlds in which Delaney is out doing her shopping, while the epistemically accessible worlds according to what Mike knows could contain such worlds.

#### 1.1.5.2 The ordering source

As Kratzer notices, a modal base alone is not sufficient to account for certain kinds of modality. Consider a conversational background consisting of the following propositions:

- (9) a. There are no murders.
- b. If there is a murder, the murderer goes to jail.

Such a conversational background is intuitively perfectly reasonable as a set of laws, albeit a small one. But consider the set of worlds that would be in a modal base built from this conversational background. In it are only worlds in which both (9a) and (9b) are true. As Kratzer points out, anything would be true in such a world. This cannot be the right set of worlds; if it were, then a sentence *John must not kill Jane*, using the modal base based on (9), would express that John does not kill Jane in all of these bizarre worlds. This is a silly result.

The conflict, and hence the silliness, arises because (9) contains a proposition expressing an ideal state of affairs, as well as what to do if the ideal is not met. Intuitively, what we want a sentence like *John must not kill Jane* to mean is that on all the ideal worlds — those in which there are no murders — John does not kill Jane. This would be trivial if (9a) were the only proposition in the modal base. But we also want the law to provide for the appropriate punishment if John does kill Jane. That is, if John kills Jane, *John must go to jail* ought to denote something true.

Kratzer's solution is to implement a different role for conversational backgrounds like the one in (9). Conversational backgrounds can still provide modal bases, as we saw above; but they can also provide partitions of the accessible worlds into different sets, with the sets ranked as to how good they are. Then the quantification is over the best circumstantially accessible worlds.

Returning to the murder case: If there are no murders in the world in which the modal is evaluated, then the best worlds are the absolute ideal worlds: i.e., all those worlds in which there are no murders. However, if in the actual world, John kills Jane, then given that the circumstantially accessible worlds must agree with the actual world on relevant facts, and assuming that John's offering Jane is relevant here<sup>5</sup> — the best we can do among the circumstantially accessible worlds is the set of worlds in which John goes to jail. Universal quantification over this set will entail that the denotation of *John must go to jail* is true, as desired.

We will use two kinds of ordering sources in later chapters: ordering sources based on the commitments of an animate entity, and inertial ordering sources, based on Dowty's (1979) concept of inertia worlds.

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<sup>5</sup>Or, as Kratzer puts it, that one function of the *if*-clause is to restrict the modal base.

### 1.1.6 Branching futures: times and worlds

Having laid out the available technologies for times and worlds, we will now start putting them together. How do times and worlds relate to each other in the model?

It seems unobjectionable to say that there is some sort of indeterminacy — that is, modality — in expressions that talk about the future. But the real question is the nature of that modality. If there is an actual future, just as there is an actual past, any modality must surely be epistemic. So there is no special modality about future times that is not shared by non-future times. There is a fact of the matter about the future, but we just don't know what it is. On the other hand, if there is no fact of the matter about the future, the modality involved might well be metaphysical. Then future times would involve quantification over worlds, while non-future times would not.

There seems initially to be no obvious evidence for one view or the other. The call seems to come down to philosophical preference, or indeed a creed, as in the epigram at the beginning of the chapter. Later I will argue that the modality involved in the future-oriented expressions is different from either one of these options; the worlds being quantified over are neither all the epistemically accessible nor all the metaphysically accessible worlds.

Leaving this question for subsequent chapters, however, we still need to lay out how times and worlds interact in any modal that has both.

First of all, we need to relativize the accessibility relation of modals to times, as many have previously noted. If we say that Eric must be at home, the propositions that are relevant are only those about his present obligations, or what is presently known, not about his past obligations, for instance, or what was formerly known. Another way of putting this fact is that temporal location affects the set of worlds quantified over. In this dissertation we will see that the modal's being relativized both to an input world and an input time can also explain otherwise mysterious interactions between aspectual properties and the set of worlds quantified over.

Thomason (1970) (who is decidedly on the metaphysical side of the future debate) provides us with a formal system for temporally-relativized modality. His future operator is given in (10).

(10) (Thomason, 1970)

For any instant  $i$  and world  $w$ ,  $\llbracket \text{FUT } Q \rrbracket^{giw} = 1$  if  $\forall w', w'$  a world that agrees with  $w$  up to  $i$ :

$$\begin{aligned} & \exists k: i < k \text{ and } Q(k)(w') = 1; \\ & = 0 \text{ if } \forall w', w' \text{ a world that agrees with } w \text{ up to } i: \\ & \quad \neg \exists k: i < k \text{ and } Q(k)(w') = 1; \\ & \text{and is undefined otherwise.} \end{aligned}$$

The definition in (10) says that for any instant  $i$  and world  $w$ ,  $\llbracket \text{FUT } Q \rrbracket^{giw}$  is defined just in case all the worlds share a truth value for  $Q$  at the time in question. Then, if  $\llbracket \text{FUT } Q \rrbracket^{giw}$  is defined, it is true if on all worlds that agree with  $w$  up to  $i$ , there is some time  $k$  which is later than  $i$ , at which  $Q$  is true; and it is false if on all worlds that agree with  $w$  up to  $i$ , there is no time  $k$  which is later than  $i$  at which  $Q$  is true.

This definition is designed to capture the fact that future statements exhibit an excluded middle; (11a) asserts that all the worlds are sea-battle-tomorrow worlds, and (11b) asserts that all the worlds are non-sea-battle-tomorrow worlds. (11b) does not assert that not all the worlds are sea-battle-tomorrow worlds.

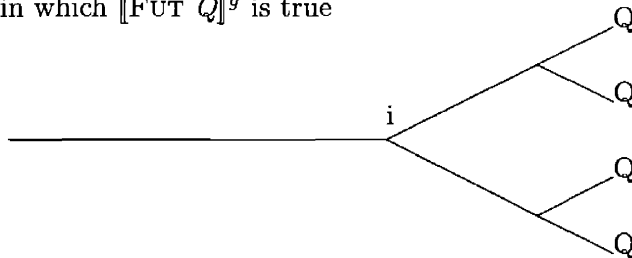
- (11) a. There will be a sea battle tomorrow.  
b. There won't be a sea battle tomorrow.

Thomason's definition accounts for this fact by presupposing that the worlds are either all  $Q$  worlds or none of them are.

If we were to envision worlds as timelines, and disagreement between two worlds as a binary branching, we might represent the set of worlds quantified over by  $\text{FUT}$ , evaluated at  $i$  and the actual world, as in the diagram below (which shows a state of affairs in which  $\llbracket \text{FUT } Q \rrbracket^{giw}$  is true).



(12) A case in which  $\llbracket \text{FUT } Q \rrbracket^g$  is true



We will be using a concept of the branching future similar, though not identical, to this. We will treat futures as ordinary Kratzer modals, and deal with the problem of the excluded middle in another way.

## 1.2 Overview

Now that we have seen the formal tools that will inform our analysis, here is a brief overview of what the analysis will encompass.

As I have said, the goal of this dissertation is to investigate the meanings of the ways that we can talk about the future with a high degree of confidence. As this is a project in compositional semantics, we will be trying to find out both the meanings of parts of sentences, and how the parts are put together to form the meaning of the whole sentence. We will find that the future elements have presuppositional, modal, and aspectual components. Therefore we will want to determine what each of these components is for each way of talking about the future. We will then want to investigate the structures these components are in; how they are put together into logical forms.

These ways of talking about the future turn out to have a lot in common. They share a presuppositions that someone or something controls the future; a universal metaphysical modal with similar ordering sources; and aspectual operators that affect the modal properties of the sentence. They differ only in their ordering sources and their aspectual operators.

Chapter 2 begins our journey into the future with sentences that apparently have no future morpheme in them, give or take a future adverbial. Such sentences are called *futurates*, and their properties are somewhat surprising. Two examples of futurates are given in (13); “simple” here is not a comment on the transparency of the meaning of (13b), but

on the morphological fact that the verb has no overt aspectual morphology.

- (13) a. Progressive futurate: The Red Sox are playing the Yankees tomorrow.  
b. Simple futurate: The Red Sox play the Yankees tomorrow.

I argue that these have a *direction presupposition*: a presupposition that an entity, the *director*, can see to it that the eventuality described by the proposition takes place, or that it does not take place. The assertion is simply that the director is committed to making the eventuality to happen, where the director's commitments provide the ordering source for the modal. Futurates without directors are treated with an *inertial* ordering source, drawing on earlier proposals regarding inertia worlds (Dowty, 1977, 1979). There are various aspectual operators involved in futurates as well; the progressive in (13a), and, I argue, the generic in (13b).

In chapter 3 I take up the issue of *will* and *be going to* and their close relatives in a handful of other languages: how are they the same, and how are they different? I find that *will* behaves similarly to generics and perfectives, and *be going to* behaves similarly to progressives, in a number of ways. I show how the subinterval property or lack thereof on various parts of the clause affects which future worlds are quantified over.

Chapter 4 looks more closely at futurates, *will*, and *be going to* in conditionals in English, and how aspect affects modality. The data examined tell us about the syntactic structure of different conditionals, and the temporal interpretation of conditionals.

Chapter 5 looks back at the questions answered, and those raised, by this research.

## Chapter 2

# Modality and Aspect in Futurates

The future is no more controllable than it is predictable.  
The only reliable attitude to take toward the future is  
that it is profoundly, structurally, unavoidably perverse.

-Stewart Brand  
*How Buildings Learn*, 1995

A *futurate* is a reading of a sentence with no obvious means of future reference, which nevertheless has a future-oriented eventuality that must be (in some sense to be made more precise) plannable. The sentences in (14) and (15) are examples of futurates. The (a) examples, which discuss a plannable event (a baseball game), are far more acceptable than the (b) examples, which refer to an unplannable event (the Red Sox's winning).

- (14) a. The Red Sox play the Yankees tomorrow.  
b. # The Red Sox defeat the Yankees tomorrow.
- (15) a. The Red Sox are playing the Yankees tomorrow.  
b. # The Red Sox are defeating the Yankees tomorrow.

The (a) examples convey, roughly, that there exists a plan for the Red Sox and the Yankees to play tomorrow; the (b) examples, however, are decidedly odd. By comparison, there is nothing odd about (16):<sup>1</sup>

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<sup>1</sup>Lest the reader object that there *is* something a little odd about (16), I would point out that at the time of this writing, the Red Sox are 7 and 7 against the Yankees for the season.

- (16) The Red Sox will defeat the Yankees tomorrow.

Rather the oddness of (14b) and (15b) seems to stem from the fact that the winner of a baseball game is (usually) not decided ahead of time. The sentences in (14b) and (15b) improve markedly in a context where it is presupposed that the winner can be decided ahead of time, in a fixed game, for instance.<sup>2</sup>

As can be seen in (14) and (15), in English both simple and progressive forms have futurate readings.<sup>3</sup> There are a number of differences between the progressive futurate and the simple futurate that will be pointed out. We will mainly be concerned with what the progressive futurate and simple futurate have in common, however, until we have developed a hypothesis about futurate meaning.

In the first section, I develop such a hypothesis. In section 2.2, I take on the question of the compositional structure of futurate meaning. Section 2.3 provides some syntactic evidence for that structure.

## 2.1 Meaning

### 2.1.1 Initial hypothesis: PLAN

Consider again the futurate contrast in (15), repeated below.

- (17) a. The Red Sox are playing the Yankees tomorrow.  
 b. # The Red Sox are defeating the Yankees tomorrow.

As noted, above, (17a) seems to say that there is a plan for the Red Sox to play the Yankees tomorrow.

We can also detect this plan in another way. The time over which the plan is asserted to hold is constrained by tense and can also be constrained by a temporal adverbial. So (18) seems to convey that at some time in the past, for a period of two weeks, there was a plan for the Red Sox to play the Yankees today.

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<sup>2</sup>Early work on futurates includes Prince (1971); Lakoff (1971); Vetter (1973), and Dowty (1979, 1977). More recently, Landman (1992); Cipria and Roberts (2001). See Binnick (1991) for an overview.

<sup>3</sup>If the English simple form is a perfective in this case, this is unusual cross-linguistically; perfectives do not normally have futurate readings. However, in section 2.2.3, I will argue that the simple form has a futurate reading only by virtue of having a generic reading, which is another property the English simple would not be expected to have if it were a “real” perfective.

(18) For two weeks, the Red Sox were playing the Yankees today.

As an initial hypothesis, let's assume that futurates have an operator, called PLAN, that contributes the existence of a plan, along with a temporal variable for the plan to hold at.

(19)  $\text{PLAN}(p)(w)(t) = 1$  iff there exists a plan at  $t$  such that in all worlds  $w'$  compatible with the plan:  $[\exists t' > t: [p(w)(t')]]$

PLAN takes a proposition, a world, and a time, and says of them that there is a plan, at that time and in that world, for the proposition to hold at some later time in the same world. (We are assuming a non-branching future until forced to do otherwise.) The plan provides the modal base for a modal quantifier.

If futurates really do involve a modal, we should be able to restrict the modal quantifier with an *if* clause. It turns out that we can. Consider (20).

(20) If the weather is good tomorrow, Joe is leaving.

What this sentence conveys is that Joe has a plan (or someone has a plan for him) that consists of the following: if the weather is good, he leaves. So in the worlds most compatible with the plan in which the weather is good, Joe leaves. The *if* clause does restrict the quantifier. This is exactly what we would expect if the plan meaning is achieved with a modal operator.<sup>4</sup>

We have now a hypothesis for the meaning of futurates: they assert that there is a plan at  $t$  for  $p$  to happen at some later time. However, this analysis fails to account for certain facts.

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<sup>4</sup>This reading is different from say, an epistemic reading. An epistemic reading is not possible with an unplannable eventuality in the antecedent for reasons which we will discuss in chapter 4. If there is a plannable antecedent, as in (1a), there are three readings, as in (1b), (1c), and (1d).

- (1) a. If Jenn gets here this evening, Norvin is leaving tomorrow.
- b. In all the worlds most compatible with what is known and having a plan for Jenn to get here this evening, there is a plan for Norvin to leave tomorrow.
- c. In all the worlds most compatible with Norvin's plan that have Jenn getting here this evening, Norvin leaves tomorrow.
- d. In all the worlds most compatible with Norvin's plan that include Jenn having a plan to get here this evening, Norvin leaves tomorrow.

The *if* clause can either restrict an epistemic modal, with futurates in each constituent clause, or it can restrict a futurate plan, in which case the antecedent can be a non-futurate, as in (1c) (and (20), for that matter) or a futurate, as in (1d).

### 2.1.2 Disadvantages of this approach

There are two problems for the PLAN hypothesis: a problem with the assertion, and the need for a presupposition.

#### 2.1.2.1 A problem with the assertion

If futurates really just assert that there is a plan for the eventuality to occur, we would expect futurates to have the same entailments as those that arise when it is explicitly stated that there is a plan. However, this is not the case, as shown in (21).

- (21) a. # The Red Sox play the Yankees tomorrow, but they won't/might not.  
b. There is a plan for the Red Sox to play the Yankees tomorrow, but they won't/might not.

If the existence of the plan really is the assertion, it is not clear why simply asserting that there is a plan, as in (21b) should be any different from asserting the futurate. Yet the futurate shows a conflict with denying that the eventuality will happen, while the assertion that there is a plan does not. The PLAN hypothesis cannot account for this difference.

Perhaps we need to add to the analysis a high level of speaker confidence that the eventuality will happen.

#### 2.1.2.2 The need for a presupposition

The second problem has to do with presuppositions.

If the assertion is, as we said above, that there is a plan for the eventuality to happen, then the example in (22a) is predicted to have different meanings from the meaning it actually has. (22a) is predicted to mean the same as (22b). But if it meant that, then (23a) would be expected to mean the same as (23b).

- (22) a. I doubt that the Red Sox are playing the Yankees tomorrow.  
b. I doubt that there is a plan for the Red Sox to play the Yankees tomorrow.
- (23) a. # I doubt that it's raining tomorrow.  
b. I doubt that there is a plan for it to rain tomorrow.

(23b) is felicitous, however, while (23a) is odd. This fact cannot be explained if (23a) is supposed to have the same meaning as (23b).

To account for this fact, we seem to need a presupposition in the futurate, but not in the explicit plan sentence, entailing that *p* describes the kind of eventuality that could be planned.

### 2.1.3 A solution and its implications

#### 2.1.3.1 A solution

Consider the problematic examples again.

- (24) a. # The Red Sox are playing the Yankees tomorrow but they might not.  
b. I doubt that the Red Sox are playing the Yankees tomorrow.

The first problem, the unacceptability of (24a), seems to indicate that the speaker of a futurate has some high level of confidence that the future eventuality will happen. How might we implement this intuition in the semantics?

The second problematic example, in (24b), sheds some light on this question. We saw above that what the speaker is in doubt about in (24b) is not whether the game will happen or not, but whether the game is planned to happen or not. From this fact we may conclude that any confidence on the part of the speaker about whether the game will happen or not is not part of the assertion.

Suppose, then, that the speaker of a futurate presupposes that the eventuality will actually happen. But this too does not seem right, as Vetter (1973) argues. If that were the presupposition, the sentence in (24b) would deny its own presupposition, because the presupposition of the embedded clause would be retained in the matrix clause. To see this, consider (25).

- (25) I doubt if John has quit smoking,

The matrix clause, like the embedded clause, presupposes that John smoked at one time. Vetter argues that this is also what would happen in (22a), resulting in a contradiction. (22a) would assert that the speaker doubted whether the Red Sox would play, but presuppose that the speaker was sure that they would play. Therefore a presupposition of speaker confidence is not the correct presupposition for futurates.

The appropriate presupposition seems to be conditional: the speaker is certain that *if* the plan says the Red Sox play the Yankees tomorrow, they will. This can be both a presupposition of the embedded clause and the matrix clause without contradiction, and yielding the correct judgments. If it is presupposed that the entity making the plan has the ability to see that the eventuality is carried out, that will rule out cases such as *I doubt that it is raining tomorrow*, cases where there could not possibly be such a plan.

A conditional presupposition also seems right for futurate questions, as in (26), where we certainly would not want the speaker to be presupposing that the Red Sox are playing the Yankees tomorrow.

- (26) Are the Red Sox playing the Yankees tomorrow?

So a conditional presupposition that if *p* is planned, *p* will happen, seems plausible for futurate presupposition.

But where would such a presupposition come from? The connection must be that the speaker has faith in the validity of the plan. That is, the speaker has faith that the entity doing the planning has the ability to carry out the plans; that if the plan is made, it will be realized. If we then assume that the following are the assertion and presupposition of futurates, we can account for the problem with (24a).

- (27) a. Assertion: There is a plan for *p* to happen at some later time  
 b. Presupposition: The entity making the plan for *p* has the ability to ensure that *p* happens

The reason (24a) is a contradiction is that the second conjunct contradicts an entailment of the first conjunct. The utterer of *The RS are playing the Yankees tomorrow* presupposes that the plan for them to do so is made by someone who has the ability to see that such a plan is carried out (Major League Baseball, in this case). Combined with the assertion that there is such a plan, it is entailed that the plan will come to fruition. Thus it feels like a contradiction for the speaker to continue by saying it might not.

At this point we have a hypothesis about both the assertion and presupposition of futurates. Let's investigate them more closely, and in particular, investigate what it means for an entity to have the ability to realize a plan.



### 2.1.3.2 Directors

Having faith in the plan, as I mentioned, means having faith in the ability of the entity making the plan to ensure that the plan is realized. Surely the individual making the plan must be able to decide whether the planned eventuality will happen or not, for the plan to really count as a plan, rather than a delusion. To show this, let's consider my cousin Max. He is four years old, and as a consequence, does not have the ability to make plans about his family's activities. Being a four-year-old, however, he sometimes behaves as though he believes he does. Suppose Max says the sentence in (28a) and his mother Chelsea says the sentence in (28b). If Max believes what he said instead of what his mother said, he is delusional. I am justified in believing Chelsea instead of Max, because I know that she has the ability to realize such plans, while he has no such ability.

- (28) a. We're seeing Spiderman tomorrow.  
b. We are not seeing Spiderman tomorrow.

For Chelsea to have this ability means that whatever she says, goes. If she wants an eventuality to happen, it happens. And equally, if she doesn't want an eventuality to happen, it doesn't happen. That at least is the assumption. Readers who are themselves parents of four-year-olds can easily come up with counterexamples. Or Chelsea may utter the sentence in (29), but if there are flash floods and they cannot get to the theatre the next day, what she said hasn't gone.

- (29) We're seeing Scooby Doo tomorrow.

This kind of thing happens now and then. (There are, indeed, a great many forces more powerful than one's mother, hard though that is to imagine when one is four years old.) It does not shake our belief in Chelsea's authority as a mother if there happens to be a flash flood just as they start out for the movie theatre. We still want to presuppose that what Mom and Dad say, at least about certain events, goes.<sup>5</sup> All the flash flood example signifies is that we can presuppose that Mom and Dad have control over a certain eventuality, but it may turn out that they don't.

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<sup>5</sup>What if Mom and Dad disagree? If they are really sharing control they probably won't talk about the possible options using futurates. The reader can verify this by trying some futurates on his or her spouse.

The ability to make plans is, of course, sensitive not only to the individual and the eventuality, but also to times and worlds. The fact that Max will someday have the authority to decide what movies he sees means that ability to make valid plans should be relativized to times. The fact that there is a reading of (30), below, on which he is not merely mistaken about the content of the family's plan, but delusional about his authority to make plans for the family, means that this authority is sensitive to worlds as well.

(30) Max thinks we're seeing Spiderman tomorrow.

On the delusional reading, (30) would entail that in Max's belief-worlds, he has the authority to make plans for the family, even though in the actual world he doesn't.

Let us define *d directs p in w at t* to capture this notion of the ability to make a valid plan. The ordering source on the planning modal gives us the best possible worlds according to d's commitments. (Kratzer, 1991). How to express what will happen, on the other side of the biconditional, is less clear. It could be a metaphysical modal base with an empty ordering source, or a single future. We do not have any way to decide between these alternatives, so I will just use the former option.

(31) An entity *d directs* a proposition *p* in *w* at *t* iff:  
 $\forall w'$  metaphysically accessible from *w* at *t* and maximally consistent with *d*'s commitments in *w* at *t*:  
 $[\forall w''$  metaphysically accessible from *w* at *t*:  
 $[\exists t' > t: [p(w')(t')] \Leftrightarrow [\exists t'': [p(w'')(t'')]]]$

Thus (32) is the presupposition we want for futurates, where *d* is the contextually supplied director, who may or may not be a participant in the planned event:

(32) *Direction presupposition*: *d directs p in w at t*

This presupposition, as desired, rules out cases like (33) since no one can direct the proposition expressed.

(33) # It's raining tomorrow.

As in Dowty's analysis, in the assertion we want an aspectual element that takes a modal element. The denotations we wish to use are as follows:

(34)  $ALL_b(d)(q)(w)(t) = 1$  iff  $\forall w'$  metaphysically accessible from  $w$  at  $t$  and maximally consistent with  $d$ 's commitments in  $w$  at  $t$ :  $[\exists t' > t: [q(w')(t')]]$

(35)  $SOME_t(q)(w)(t) = 1$  iff  $\exists t'$  that includes  $t: [q(w)(t')]$

So the meaning I am proposing for progressive futurates is:

(36)  $SOME_t(ALL_b(d))(q)(w)(t) = 1$  iff  $\exists t'$  that includes  $t: [\forall w'$  metaphysically accessible from  $w$  at  $t$  and maximally consistent with  $d$ 's commitments in  $w$  at  $t: [\exists t'' > t': [q(w')(t'')]]$

Presupposed:  $d$  directs  $q$  in  $w$  at  $t'$

Note as well that direction is sensitive to both times and worlds. Sensitivity to times means that futurates should still be true if, say, the director wanted  $p$  in the past but doesn't want  $p$  now. This is so; the examples in (37) are fine.

(37) a. Q: What are you ordering?

A: I WAS getting the oysters, but then I remembered that it's not a good idea to order seafood on Mondays.

b. A few months ago, I was moving to Tucson, but now I'm moving to Helsinki.

Past futurates should also be true even if the director in the past no longer directs  $p$  now. This is the case, as in (38). Bill Clinton directed the proposition until Bush became president; the past futurate might well be true:

(38) The United States WAS signing the Kyoto treaty until George W. Bush became president.

Finally, sensitivity to times should mean that a past futurate is false if it wasn't wanted by  $d$ , or if  $d$  had no opinion on it, even if it happened anyway. This is true as well; in the context where the Red Sox were not scheduled to play the Yankees, but then the Yankees happened to be in town and they played a pickup game with the Red Sox, the dialogue in (39a,b) is felicitous and the sentence in (39c) is false.

- (39) a. A: Are the Red Sox playing the Yankees tomorrow?  
           B: (looking at a schedule) No, they're not.  
           (the pickup game occurs)
- b. A: You said the Red Sox weren't playing the Yankees today!  
           B: Well, they weren't.
- c. Yesterday, the Red Sox were playing the Yankees today.

To summarize the results of this section: the assertion in futurates is that the presupposed director at *w* in *t* is committed to making *p* happen.

### 2.1.3.3 Futurates without a director

It is possible to have futurates without a plan. Leech finds (40) bad, but others do not agree, including myself.

- (40) The sun is rising tomorrow at 5:13.

Certainly the simple version of (40) is good:

- (41) The sun rises tomorrow at 5:13.

If plans are necessarily only made by animate entities, there is a problem: No one, except maybe God, makes plans for the sun to rise. I am not ready to say that (40) forces us to posit a God in the grammar, though that would certainly get us out of this difficulty; rather I would say that our idea of planning is not quite right. The right notion would encompass both the planning cases and (40). Inertia worlds may be the right thing to use here, since it is certainly normal for the sun to rise that the time determined by the gravitational force, etc.

So both ongoing and futurate progressives have both a bouletic and an inertial reading. Is there any principled reason why bouletic and inertial readings should occur together?

Here is what such a unification might look like. Suspend your disbelief for a moment and pretend that the universe, though inanimate, has commitments. We can make sense of this bizarre idea by noting that an entity's commitments are just those things such that if the entity should ever have the power to make them happen, they do happen. The universe, by way of the laws of physics and so on, does have the power to make things happen. If a vase is tipping over the edge of a shelf, the universe will "insist" that it fall. If John is sleeping,

the universe will “want” him to continue to sleep. Of course, we could catch the vase or wake John up. But in these cases, we are interfering with what the universe “wants” or is committed to. Essentially we are demoting the universe from its position as director. (We saw this kind of demotion earlier with Chelsea and the flash floods.) So even when the universe is committed to something, it still might not happen; this is the core observation that led Dowty to propose inertia worlds to begin with, and this is why we don’t just want an empty ordering source instead. If it were an empty ordering source, there would be no way to trump the universe by catching the vase or waking John up.

One way in which the universe (qua director) is different from animate directors is that it lacks the power to plan ahead. I can direct my activities for tomorrow, but the universe cannot. The completion or continuation of an event can only be true on all worlds most consistent with the universe’s commitments if the event has already begun. Let’s call this the Inertia Principle:

- (42) *Inertia Principle (to be revised)*: The universe is committed to and has the ability to bring about only the completion or continuation of eventualities that are already underway.

If we assume that the sun’s rising is a kind of clockwork (as Newton saw it), then the sunrise futurate also makes a certain amount of sense. What is continuing is the pattern of rising and setting; perhaps it is that a compelling cause is already underway. We might try the following principle.

- (43) *Inertia Principle*: The universe is committed to and has the ability to bring about only the completion or continuation of eventualities that are already underway or whose compelling cause is underway.

Generics as well seem to have both inertial and bouletic ordering:

Generics famously do not require the event to actually be happening at the time of utterance. For example, (44a) can be truthfully uttered even in the summer when bears are not hibernating. But most generics do require the event to have been instantiated; (44b) cannot be true in a case where bears secretly have the ability to engineer corporate takeovers, but have never actually done so.

- (44) a. Bears hibernate.  
b. Bears engineer corporate takeovers.

There is also a “lawfulness” requirement; e.g., there must be something true about bears that keeps them hibernating (Kratzer, 1989). It is not just that every year they all seem to independently happen to decide to take a nap.<sup>6</sup>

The only generics that do not require instantiation<sup>7</sup> are generics that are somehow rule-based, as in (45a) and (45b), and generics involving machines as in (45c) and (45d).

- (45) a. Sally handles the mail from Antarctica.  
b. The Speaker of the House succeeds the Vice President.  
c. This machine crushes oranges.  
d. This car goes 140 mph.

I would like to propose that the examples in (45) have a bouletic ordering source. The first two are relatively clear: Sally handles the mail from Antarctica in all situations that have mail from Antarctica and are most compatible with what the boss wants, and the Speaker of the House succeeds the Vice President in all situations where they are supposed to according to the commitments of the Constitution. The machine examples in (45c) and (45d) can be seen as being about what the designer of the machine wants; the designer certainly has the power to direct what the machine does (though again, sometimes the presupposition can turn out to be wrongly made).

In all of these cases, if the ordering source is bouletic, the events need not be instantiated. That is what we want. Generics like those in (44), however, must have had their event instantiated at least once. Those, I would like to propose, are the inertial ordering, which are really a special case of bouletic ordering. Again, the universe can only want and direct something if it is already underway; e.g., there are certain facts about bears that make them hibernate.

Let’s recall the denotations from the previous section:

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<sup>6</sup>There are some exceptions that are not problematic: lawlike properties of kinds, lawlike behavior inside stories, et cetera.

<sup>7</sup>Not counting those embedded in intensional contexts.

$$(46) \quad \text{ALL}_b(d)(q)(w)(t) = 1 \text{ iff } \forall w' \text{ metaphysically accessible from } w \text{ at } t \text{ and maximally consistent with } d\text{'s commitments in } w \text{ at } t: [q(w')(t)]$$

Presupposed:  $d$  directs  $p$  in  $w$  at  $t$

$$(47) \quad \text{SOME}_t(q)(w)(t) = 1 \text{ iff } \exists t' \supset t: [q(w)(t')]$$

$$(48) \quad \text{SOME}_{>}(q)(w)(t) = 1 \text{ iff } \exists t' > t: [q(w)(t')]$$

Generic aspect is  $\text{ALL}_t$ :

$$(49) \quad \text{ALL}_t(q)(w)(t) = 1 \text{ iff } \forall t' \supset t: [q(w)(t')]$$

( $\text{ALL}_t$ , and  $\text{SOME}_t$ , should really take situational arguments, but it is easier to work with temporal arguments. )

The generic operator GEN is then  $\text{ALL}_t + \text{ALL}_b$ .

$$(50) \quad \text{GEN}(d)(q)(w)(t) = \text{ALL}_t(\text{ALL}_b(d))(q)(w)(t) = 1 \text{ iff } \forall t' \supset t: [\forall w' \text{ metaphysically accessible from } w \text{ at } t \text{ and maximally consistent with } d\text{'s commitments in } w \text{ at } t: [q(w')(t')]]$$

Presupposed:  $d$  directs  $q$  in  $w$  at  $t$

If this is the meaning of generics, then for simple futurates we can put an existential binder with a future time relation under  $\text{ALL}_b$ , as we did in the case of progressive futurates. This seems right.

A consequence of this analysis is that the differences between simple and progressive futurates are expected to fall out of differences between GEN and PROG, though at this point it is not obvious how. There are three major differences between progressive and simple futurates. Firstly, a definite time is required for the simple futurate, but not for the progressive futurate.

$$(51) \quad \text{a.} \quad \text{Joe is leaving (sometime).}$$

$$\text{b.} \quad \# \text{ Joe leaves (sometime).}$$

Secondly, the simple futurate is infelicitous in certain cases where the progressive is felicitous.

- (52) a. Guess what? We're getting married in June.  
 b. # Guess what? We get married in June.

Though with a list intonation, it is fine.

- (53) Let's see. We move in May, get married in June, and start our new jobs in July.

And finally, while progressive futurates are possible in the past tense, simple futurates are not, unless in a Sequence of Tense context:

- (54) When does Lowe start next?  
 a. Lowe was starting tomorrow against the Yankees.  
 b. # Lowe started tomorrow against the Yankees.  
 c. Jenny said that Lowe started tomorrow against the Yankees.

So far we have no explanation for any of these properties, but the prediction is that an aspectual difference between simple and progressive futurates is responsible.

To summarize the discussion so far in this section: since the semantics of planning (direction, commitment, and so forth) are necessarily modal, and since there seems to be a similar modality associated with the progressive operator in ongoing readings of progressives, it makes sense to see if these modals could be one and the same. This hypothesis, however, raises the question of how simple futurates get their futurate meaning. I argued that they get it from a generic operator.

In the next section, I present syntactic evidence in support of the idea that the planning modality in progressive futurates is introduced by the progressive operator.

## 2.2 Syntax

Here I argue that in progressive futurates at least, the operator, whatever it is, that introduces the plan — let's go back to calling it *PLAN* — has to be *PROG*, for syntactic reasons. First we will determine a lower bound and upper bound for *PLAN*, and then discuss some manner adverbial evidence which zeros in on *PROG* as the operator that introduces the plan.



### 2.2.1 Lower bound for PLAN

In this section, temporal adverbial and gerund evidence allow us to establish a lower bound of the *vP* boundary for the position of the hypothetical futurate operator PLAN.

#### 2.2.1.1 Temporal adverbial evidence for lower bound

First, let's look at temporal adverbials. They can appear both clause-initially and clause-finally in futurates. Each position is associated with a particular time: the high adverbial constrains the time at which the plan is asserted to hold, and the low adverbial constrains the time at which the planned event is scheduled to take place. These adverbials cannot be switched (e.g., (55b) cannot be used to express what (55a) expresses).

- (55) a. Yesterday, the Red Sox were playing the Yankees tomorrow.  
b. \*Tomorrow, the Red Sox were playing the Yankees yesterday.

Assuming unselective binding by temporal adverbials, this means that the plan time is bound higher than the position of the lower adverbial. Where is this lower adverbial? VP-fronting evidence indicates that it is part of the VP (that is, the *vP*):

- (56) VP-fronting  
a. Mary said the Red Sox are playing tonight, and [playing tonight] they are.  
b. \*Mary said the Red Sox are playing tonight, and [playing] they are tonight.

If we also make the reasonable assumption that our hypothetical PLAN operator introduces the time at which the plan is asserted to hold, we may conclude that PLAN is located somewhere higher than the *vP*.

#### 2.2.1.2 Gerund evidence for lower bound

Gerund evidence also puts PLAN higher than the VP, as there turns out to be a correlation between the possibility for futurate readings and how much inflectional structure there is in the gerund. There are three kinds of English gerunds, which have been argued (Horn 1975, Reuland 1983, Abney 1987) to contain different subsets of the entire range of verbal and INFL projections. "Acc-ing" gerunds assign accusative case to their subjects. The other two, "poss-ing" and "ing-of," assign genitive case to their subjects. Ing-of gerunds in addition require their theme to be in an *of* phrase.

- (57) a. acc-ing:  
           John singing the Marseillaise
- b. poss-ing:  
           John's singing the Marseillaise
- c. ing-of:  
           John's singing of the Marseillaise

Acc-ing gerunds are larger than poss-ing gerunds, Abney argues, since the former share various properties with full sentences which poss-ing gerunds do not share. For instance, inanimate subjects are fine in both sentences and acc-ing gerunds, but not acceptable in poss-ing gerunds.

- (58) Abney
- a. sentence: We were very upset that the refrigerator tipped over.
- b. acc-ing: We were very upset at the refrigerator tipping over.
- c. ? poss-ing: We were very upset at the refrigerator's tipping over.

Secondly, no wide scope is allowed out of a higher clause for subjects.

- (59) a. sentence: John is mad that everyone took a day off. (\*wide)
- b. acc-ing: John disapproves of everyone taking a day off. (\*wide)
- c. poss-ing: John disapproves of everyone's taking a day off. (wide ok)

Quantifier raising is well-known to be clause-bound. The fact that the sentences in (59a,b) are good reveals that acc-ing gerunds are large enough to have a clause, while poss-ing gerunds are not.

Thus acc-ing gerunds are larger than poss-ing gerunds. How much larger? The fact that poss-ing gerunds can assign accusative case to a direct object is a reason to grant poss-ing gerunds at least a *v*P. In fact, poss-ing gerunds, like acc-ing gerunds, are evidently large enough to support perfect morphology, as in (60b) below. Ing-of gerunds, however, are apparently not, since (60c) is not acceptable.

- (60) a. acc-ing: Sue having eaten sardines  
 b. poss-ing: Sue's having eaten sardines  
 c. \* ing-of: Sue's having eaten of sardines

Let us assume, then, that acc-ing gerunds and poss-ing gerunds have a full *vP* and at least some inflectional projections, but that ing-of gerunds are just a root. (cite Alec) As a consequence, if PLAN is above the *vP*, as the temporal adverbial evidence above suggested, we would expect it to be able to appear in acc-ing and poss-ing gerunds, but not in ing-of gerunds; that is, only structures with a *vP* should be able to host PLAN and have futurate readings. This is because whatever PLAN is, it must select for either a *vP* or some phrase larger than a *vP*. Structures with less than a *vP* would not be able to be selected by PLAN.

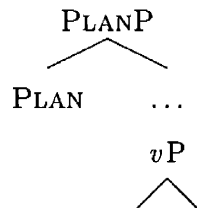
The prediction is borne out: we do see futurate readings in acc-ing and poss-ing gerunds, but not in ing-of gerunds. Compare (62), (63), and (64) to the judgments in (61), which exemplify the futurate pattern (good with plannable eventualities, bad with unplannable ones). The examples in (62) and (63) have the same pattern of judgments, but (64) is different.

- (61) full sentence  
 a. John is buying a condo next year.  
 b. # John is winning the Pulitzer next year.
- (62) acc-ing  
 a. Mary was upset about John buying a condo next year.  
 b. # Mary was upset about John winning the Pulitzer next year.
- (63) poss-ing  
 a. Mary was upset about John's buying a condo next year.  
 b. # Mary was upset about John's winning the Pulitzer next year.
- (64) ing-of  
 a. # Mary was upset about John's buying of a condo next year.  
 b. # Mary was upset about John's winning of the Pulitzer next year.

This supports the idea that PLAN is located just *vP*; ing-of gerunds, without *vP*, are not large enough to have a PLAN so they do not have futurate readings.

Thus both temporal adverbial and gerund evidence both point to a lower bound for PLAN of the *vP* boundary.

(65) Lower bound for PLAN: *vP*



## 2.2.2 Upper bound for PLAN

In this section I argue that the location of PLAN cannot be any higher than the location of PROG. This being the case, combined with the results of the previous section, PLAN in progressive futurates must actually be PROG.

### 2.2.2.1 Background on punctual adverbials

To show that PLAN cannot be higher than PROG in progressive futurates, we will be using punctual temporal adverbials. First, some background.

In non-futurates, punctual temporal adverbials (*at noon*, *when the sun went down*, e.g.) can be used to highlight differences between progressives and simple forms of eventives. For example, consider the non-futurate reading of the progressive sentence in (66). What this reading says is that at noon, the eating event of which John was the agent and sardines the theme was ongoing:

(66) John was eating sardines at noon.

With simple eventives, there is never a reading in which the event is ongoing at the time described by the punctual adverbial. Instead, the event is seen either as starting at this time and continuing (an inchoative reading) or starting and being completed, quasi-instantaneously, at that time (a completive reading).

In (67), the most natural reading is the inchoative reading, where the eating starts at 10:47, but also possible is the implausible completive reading, in which the eating lasts a minute or less.

(67) John ate sardines at 10:47.

In what follows I will lump together completive and inchoative readings; their presence will be used to diagnose verbs to which a progressive does not apply.

### 2.2.2.2 Punctual adverbials in progressive futurates

The point of all this is to put punctual adverbials in progressive futurates, to determine where the stativity in the progressive is ending up in progressive futurates. This in turn will tell us about the location of PLAN. We already know from the previous section that PLAN can't be below PROG. Thus it is either above PROG, or it is PROG. If PLAN is above PROG, we would expect the verb to have progressive semantics, and not permit a completive/inchoative reading. But this is not the case. The example in (68) definitely permits a reading in which the game begins at 7pm.

- (68) The Red Sox are playing the Yankees at 7:00 pm.

That means that the progressive is not really applying to the verb phrase in the usual way. This is expected if what the progressive is doing is what we said PLAN did.

The upper bound for PLAN is thus no higher than PROG. We conclude that it is under PROG.

### 2.2.3 Manner adverbials

We have just determined that the plan component of the meaning is higher than  $v_P$  and no higher than PROG, the progressive operator. From this we concluded that PLAN was lower than PROG. However, the possibility that the plan part of the meaning *was* PROG was not excluded. Here I will provide syntactic evidence that in the case of the progressive futurate, the progressive operator is in fact where the plan meaning resides. That is, we will examine the claim, presupposed by the PLAN hypothesis, that the operator that contributes the plan meaning is in a syntactically different position than the progressive operator, and demonstrate that it leads to a contradiction.

#### 2.2.3.1 Background on manner adverbials

Jackendoff (1972) discusses certain adverbs which can receive different interpretations depending on their location in the sentence; they can either describe the manner of the event (the “manner” reading), or they can describe the manner in which the subject participates

in the event (the “subject-oriented” reading). *Cleverly* and *stupidly* are two such adverbs. *Cleverly* in (69a) has only the manner reading: ‘John answered the question in a clever fashion’. (69b), according to Jackendoff, has both that reading and the subject-oriented reading: ‘it was clever of John to answer the questions’. (I find the manner-oriented reading for (69b) somewhat marked.)

- (69) a. John answered the question cleverly.  
b. John cleverly answered the question.

That these are two different meanings for the adverbs can be shown by the fact that such adverbs can occur together; (70) says that it was clever of John to answer the question in a stupid manner. That is, his participation was clever, though the event itself was stupid.

- (70) John cleverly answered the question stupidly.

Manner adverbials can generally appear in either position, although in some cases a meaning difference between the two positions is not terribly clear, as in (71):

- (71) a. John answered the question secretly/carefully/suddenly =?  
b. John secretly/carefully/suddenly answered the question.

The reason for this seems to be simply that some adverbials are more conducive than others to holding just of the subject’s participation in the event, without holding of the event itself (and vice versa). This does not mean, however, that these adverbials are different from *cleverly* and its ilk. With a bit of finessing we can set up contexts in which the examples in (72), with apparently contradictory adverbials, make sense. For example, John’s answering the question may be secret to some, and obvious to others; he may be quite careful in affecting a careless attitude as he answers; and he might suddenly begin his answer and then take a long time to finish.

- (72) a. John secretly answered the question in plain view.  
b. John carefully answered the question carelessly.  
c. John suddenly answered the question gradually.

Thus we will consider all of these adverbs to be interpretable with either a manner reading or a subject-oriented reading.

### 2.2.3.2 Manner adverbials and progressive futurates

In progressive futurates as well, manner adverbials can have either a manner reading or a subject-oriented reading. The subject-oriented reading of the adverbial, however, appears to involve a description of the subject's participation in the plan, not the subject's participation in the planned event.

- (73) a. Nomar is practicing cleverly/secretly tomorrow.  
b. Nomar is cleverly/secretly practicing tomorrow.

The a examples in (73) assert that there is a plan for Nomar to practice cleverly or secretly tomorrow; the b examples assert that Nomar's making of the plan is clever or secret.

Adverbs can again appear in both slots:

- (74) a. Nomar is cleverly practicing stupidly tomorrow.  
b. Nomar is secretly practicing in plain view tomorrow.

In (74a), Nomar's participation in the plan for him to practice stupidly tomorrow is asserted to be clever. The example in (74b) says that the plan for him to practice in plain view tomorrow is secret.

How do we know that it is his participation in the plan that is being modified, not the plan itself? That is, why not say that (74a), for example, conveys that there is a clever plan for Nomar to practice in a stupid way?

Whether the progressive has a futurate or an ongoing reading, the subject-oriented reading is only possible of animate subjects when the adverbial is in the post-subject position, as in (75a). (See also Wyeth, 2000.) In the sentence-initial position, an inanimate subject is permitted, as in (75b).

- (75) a. # That statue is cleverly wearing a kilt (on the parade float tomorrow).  
b. Cleverly, that statue is wearing a kilt (on the parade float tomorrow).

Whatever the reason for this difference, I take this to show that in either case, the adverbial is modifying the participation of the director, in making the plan, not the subject's participation in the plan — which makes sense considering that the director can be other than the subject. It is just that in (74), the subject happens to be the director. For now we

will only consider cases in which the director and the subject is the same, while recognizing that there is more investigation to be done here on when this can be so.

In the next section, these adverbials in both passive progressive futurates and perfect progressive futurates will provide us with clues to the location of PLAN. *Suddenly* will be a useful adverb for us in this endeavor; let's look at it. The reason is that it is an odd modifier of a practicing event, especially when the practicing is planned ahead of time, but it is fine as a modifier of a plan. Not surprisingly, it is odd in the lower position and fine in the higher position:

- (76) a. # Nomar is practicing suddenly tomorrow.
- b. Nomar is suddenly practicing tomorrow.

This fact will come in handy as we try to determine where PLAN is.

A bit first, though, about the semantics of manner adverbials. The standard post-Davidsonian assumption about manner adverbials is that they take an event argument. (Davidson, 1997; Parsons, 1990). Is there an event argument for a subject-oriented adverbial to take as an argument? Results of Davidson's classic tests are mixed; while the planning cannot have a location or an instrument, as in (77a) and (77b) respectively, it can be referred to with a pronominal, as in (77c).

- (77) a. #? In the clubhouse, Nomar is secretly practicing in plain view tomorrow.
- b. # With a grin, Nomar is secretly practicing in plain view tomorrow.
- c. Nomar is secretly practicing in plain view tomorrow. Pedro doesn't like it.

It looks like a certain stative, in fact:

- (78) a. #? In the clubhouse, Nomar secretly wants candy.
- b. # With a grin, Nomar secretly wants candy.
- c. Nomar secretly wants candy. Pedro doesn't like it.

I am not going to worry here about how the wanting in either (77) or (78) gets referred to with a pronominal, or how it gets modified by manner adverbials. I do not want to take sides on the debate over whether states deserve event variables. All we really need is a reasonable assumption about what the syntactic relationship between the manner adverbial and the head that introduces the wanting has to be. Let us suppose that it takes the



proposition (e.g., the one expressed by *Nomar wants candy*) as an argument, and asserts of that proposition that it holds of ... something, and that there is something secret about the director's participation in that something. If that assumption is made, it is clear that the adverbial should be higher than the proposition so it can take it as an argument. Thus an adverbial with a subject-oriented reading in a futurate should be higher than whatever it is that introduces the plan.

### 2.2.3.3 Manner adverbials in more complex progressive futurates

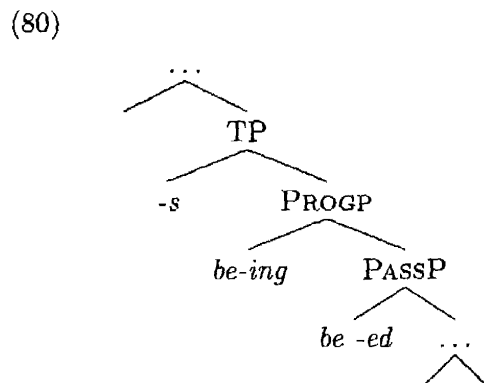
In this section we will put manner adverbials in passive progressive futurates and perfect progressive futurates, to find out where the plan meaning is located. We will find that it has to be the same position as the progressive operator.

In (79) we see that the adverbial position below passive *be* is too low for a plan-oriented reading, as evidenced by the fact that *secretly* in that position with *in plain view* in the lower position (in (79b)) is something of a contradiction. A higher position, in (79a), is not contradictory.

- (79) a. John is secretly being promoted (in plain view) tomorrow.  
 b. John is being secretly promoted (\*in plain view) tomorrow.

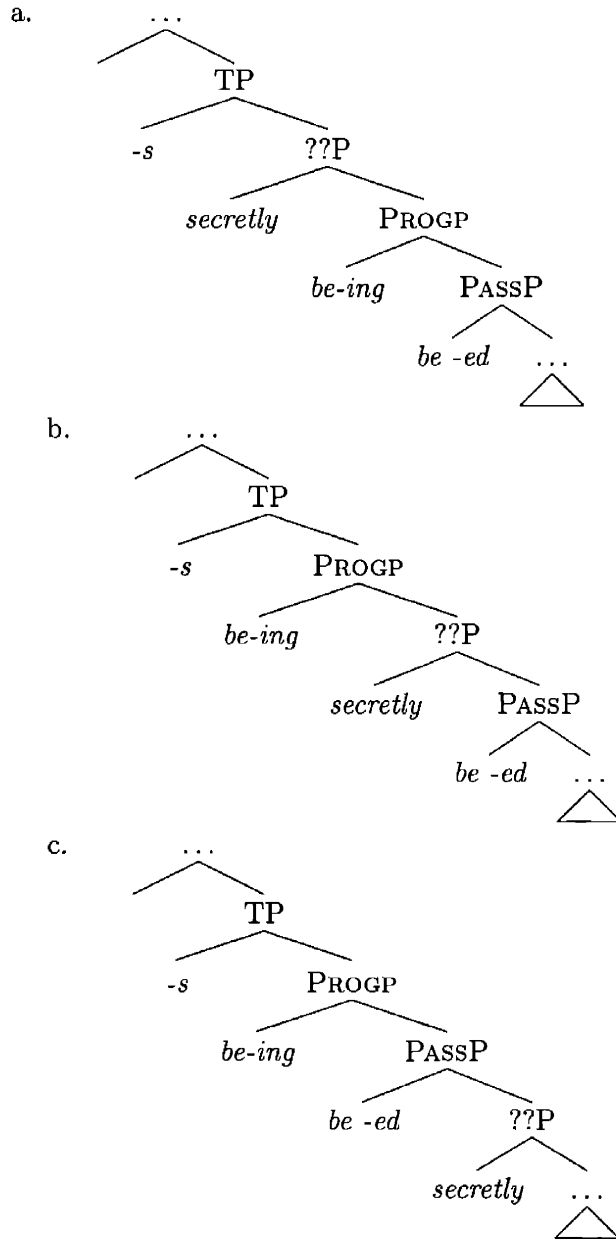
What does this tell us about PLAN?

In the passive progressive, the progressive operator, realized as *be -ing*, is higher than the passive, realized as *be -ed* (Chomsky, affix hopping). *Is* is presumably in T. The relevant section of the structure, before affix-hopping, is the following:



If adverbials like to be in specifiers, what we know of the structures for (79a) and (79b) is that (79a) could be either (81a) or (81b) (because *is* is in T), but (79b) could only be (81c).

(81)

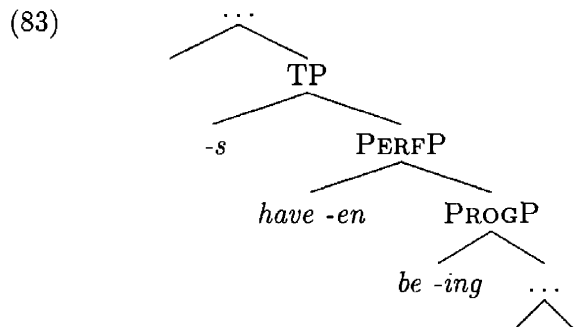


No matter where the adverbial in (79a) is, PLAN is higher than PASS. (This also entails what we showed above, that PLAN is higher than *v*P.) The plan-contributing element could, though, be PROG or something higher.

To narrow down the field still further, let's consider the perfect progressive in (82), part

of the structure of which is given in (83).

(82) Ken has been retiring in May since 1995.



The sentence in (82), like all good progressives, has two readings: an ongoing one and a futurate one. The ongoing reading says that Ken, since 1995, keeps retiring in May. He retired in May of 1995, and then couldn't help coming back to work, but then retired again in May of 1996, and so on. The futurate reading says that Ken has had a plan to retire in May (a contextually salient May, probably the first May in after the time of utterance) over a period beginning in 1995.

When we put manner adverbials into (82), something odd happens. Different readings are favored with manner adverbials in various positions. Consider, for instance, the examples in (84) (due to Sabine Iatridou, p.c.).

- (84) a. Ken has secretly been retiring in May since 1995. \*ongoing, ✓futurate  
 b. Ken has been secretly retiring in May since 1995. ✓ongoing, \*futurate  
 c. ?Ken has been retiring secretly in May since 1995. ✓ongoing, ✓futurate

In (84a), the ongoing reading is impossible and the futurate reading is possible. In (84b), the reverse is true: the ongoing reading is possible while the futurate reading is impossible. (84c) permits either reading, though it is a bit odd. These judgments are a bit tricky, so let's consider an example where the ongoing reading is ruled out for another reason. In (85), the ongoing reading seems to get ruled out because *tomorrow* is deictic to the speech time. This means that the input to the proposition expressed by *Pedro practice tomorrow* must be the speech time.<sup>8</sup>

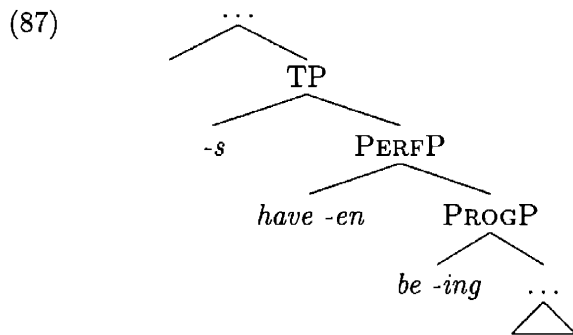
<sup>8</sup>There is a jocular ongoing reading here as well, which does not concern us.

(85) Pedro has been practicing tomorrow since last Friday.

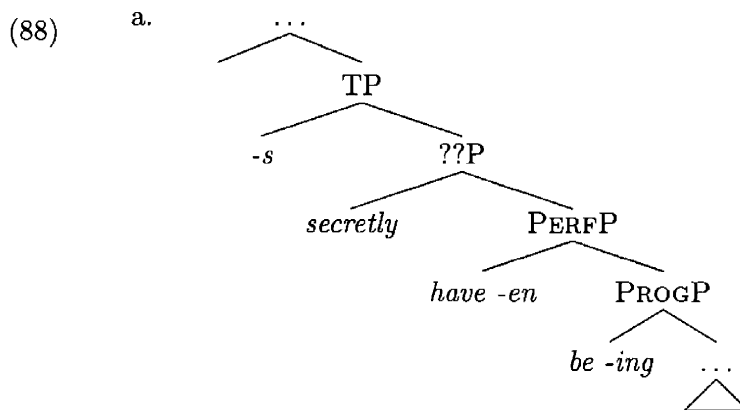
The possibilities for *secretly* in (85) are as follows.

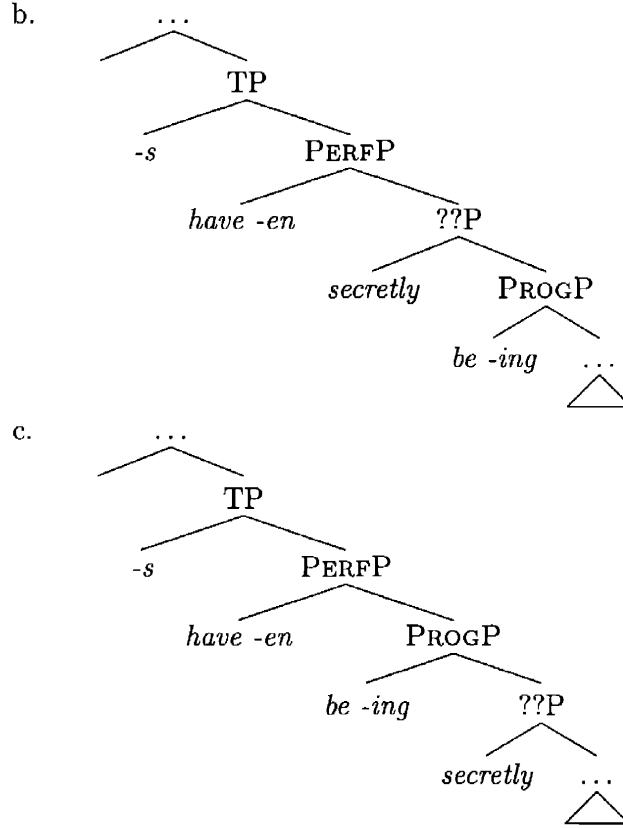
- (86) a. Pedro has secretly been practicing (in plain view) tomorrow since last Friday.  
 b. # Pedro has been secretly practicing (in plain view) tomorrow since last Friday.  
 c. Pedro has been practicing secretly #(in plain view) tomorrow since last Friday.

In any case, let's assume this structure for perfect progressives.



The adverb in (86a) could be in either the position in (88a) or the position in (88b), again because the auxiliary raises to T. The adverb in (86b), however, could only have a structure as in (88c). (In (86c), *secretly* is inside the *v*P, yielding a structure I have not shown here.)





Thus the element contributing the plan cannot be lower than PROG. If it were, the adverbial in (86b) would be able to get a plan-oriented reading, and it cannot. But above I argued that PLAN cannot be higher than PROG. Therefore PLAN is not the element we want to contribute the plan. And to the extent that the earlier argument can be generalized to anything that might contribute the plan, it seems as though what contributes the plan meaning must be the progressive operator itself. This supports what we concluded from the semantic evidence, that the modality of planning is provided by the modal in the progressive operator.

## 2.3 Conclusion

Futurates are special cases of progressives and generics and share the same semantics: a universal boulerthial modal on top of an aspectual operator  $SOME_t$  (for progressives) or  $ALL_t$  (for generics). However, futurates of both kinds have an additional existential binder for the run time of the eventuality with a future relation. The assertion of futurates is that a contextually salient director is committed to  $p$ ; the director is presupposed to be able to

bring about p or not-p. Animate directors are involved in most futurates, but in certain cases we saw that they were unnecessary; these were the inertia world cases.

In the next chapter, we will see how the same elements, aspect and bouletic-inertial modality, contribute to the meaning of *will* and *be going to* sentences.

## Chapter 3

# Ordering and Aspect in Futures

Âs cōusas mudárão dê aspécto.  
The things have changed to aspect.

-José da Fonseca and Pedro Carolino  
*English as She Is Spoke*, 1855

We saw in chapter 2 that there are two ways for a speaker to be confident enough about the future to use a futurate. One way is to be confident that someone (the agent of the sentence or some other person) has the power to determine whether an eventuality happens or not, and is committed to making it happen. The other is to be confident that the universe has that power and that (in a different sense) that commitment. For futurates, we said that the universe could only be committed the continuation or completion of eventualities that were already in some sense underway. These two options were reflected in bouletic (i.e., commitment) and inertial orderings on a universal bouletic modal with a direction presupposition. Any differences between progressive and generic futurates were taken to be aspectual in nature, and a low existential temporal binder was held to be responsible for differences between futurate and non-futurate readings.

In this chapter we shift our attention to future expressions that do not require future-oriented eventualities to be plannable or already ongoing. Two such expressions are given for English, our primary focus, in (89), and in Turkish and Indonesian in (90) and (91). In many cases, where English uses *will* and *be going to*, Turkish uses the Aorist<sup>1</sup> and the

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<sup>1</sup>Traditional terminology strikes again: the Turkish Aorist is used to talk about the future despite the fact that most aorists are used to talk about the past.

Future, and Indonesian uses *akan* and *mau*, as in (90) - (91) below. Sentences with the future morphemes in the (a) examples share various characteristics, and sentences with the future morphemes in the (b) examples share others; these will all be discussed below.

- (89) a. The Red Sox will defeat the Yankees.  
 b. The Red Sox are going to defeat the Yankees.

(90) Turkish

- a. Atla-r.  
 Jump-Aorist  
 'He'll jump.'  
 b. Atla-yacak.  
 Jump-Future  
 'He's going to jump.'

(91) Indonesian<sup>2</sup>

- a. Budi akan makan ikan.  
 Budi akan eat fish  
 'Budi will eat fish.'  
 b. Budi mau makan ikan.  
 Budi mau eat fish  
 'Budi is going to eat fish.'

I will avoid calling *will* and *be going to*, and their counterparts in other languages, future "tenses". There are pre-theoretic as well as theory-internal reasons for this avoidance. There is a long-standing debate about whether *will* is a tense or a modal (see, for example, Hornstein (1990)); *be going to* has been variously labeled prospective aspect, futurate, and so on. In addition, I will not be analyzing these items as tenses. Thus for lack of a better word I will call items like *will* and *be going to*, that give these future expressions their futurity, simply "futures".

My position on future sentences will look very similar to my account of futurates. Futures all have the same modal as each other, and the differences among futures are aspectual. Where this argument departs from the analysis of futurates in chapter 2 is that the available ordering sources for the modal are slightly different.

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<sup>2</sup>The facts given here only hold in some dialects of Indonesian. In others *akan* behaves like *mau*, with the exception of the data in (176) in section 3.5.4 below.

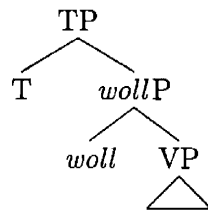


The modal similarities between different futures include universal quantificational force, and the possibility for both bouletic and inertial orderings. This makes the modal similar as the one proposed for futurates ( $ALL_b$ ) and indeed this seems right. In futurates and futures alike, there is a high level of speaker confidence, and two options for justifying the speaker confidence: the speaker presupposes either that an animate entity directs and wants  $p$ , or that the universe does. We will find, however, that in sorting these options out for futures, we will need to broaden the Inertia Principle proposed in the previous chapter.

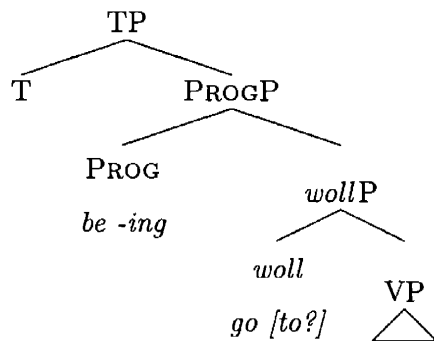
On the aspectual side, I will argue that *be going to* is the progressive version of  $ALL_b$ . There is a generic version of *will* and a null aspect (perfective) version of *will*. These aspects have detectable effects on the modal in *will*.

Among those who consider *will* to have a modal component, it is commonplace by now to assume that *will* and *would* are the present and past tense versions of a future modal termed *woll*; so far as I understand the idea originally appears in Abusch (1985). I first proposed that *woll* could support aspect as well as tense in Copley (2001). On that account, *will* and *would* have no aspect, while *be going to* has a progressive operator, as in the structures below:

(92) *Will/would*



(93) *Be going to*



We can think of  $ALL_b$  (with an appropriate ordering) as *woll*. Here, though, I will

argue, contra Copley (2001), that it is not that *be going to* has a progressive operator plus a future modal *woll*, while *will* has a generic operator plus the same modal. Rather, *be going to* has the same aspectual operator as PROG does (SOME<sub>t</sub>), and generic *will* has the same aspectual operator as GEN does (ALL<sub>t</sub>).<sup>3</sup>

But why shouldn't we, e.g., put GEN, a real generic, on top of a future modal such as ALL<sub>b</sub>, for the meaning of a generic *will*? That combination would be true just in case in generic situations a particular eventuality will happen. This is a meaning we get in Indonesian with imperfective *sedang* in front of *akan*:

- (94) a. Wati selalu sedang makan durian.  
           Wati always Impf eat durian  
           'Wati is always eating durian.'
- b. Wati selalu sedang akan makan durian.  
           Wati always Impf will eat durian  
           'Wati is always about to eat durian.'

*Sedang* in its generic meaning is, we assume, GEN, and *akan*, as we will see later, is likely to be a perfective future. The meaning of (94b) is that of a real generic on a real future. In contrast, English *will* has no such reading:

- (95) # Wati always will eat durian.

A real generic on a real future is *not* the denotation of what I am calling generic *will*. I will give justification for the ALL<sub>t</sub> ALL<sub>b</sub> denotation shortly, but for now it should be clear what we do not want as the denotation.

A great deal of evidence, not to mention fully fleshed-out denotations, will be required before we can truly assess the extent to which future and aspectual morphemes in the languages under consideration share semantic components, and the extent to which they differ. This assessment is the focus of the chapter. In sections 3.1 and 3.2, I lay out some of the evidence for both an modal and an aspectual component in futures. Section 3.1 presents evidence that the modal in futures is similar, (but not identical) to the one that occurs in PROG and GEN, and works out some modal and temporal issues that arise; section 3.2 investigates the different aspects that this modal can have: progressive, generic, and

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<sup>3</sup>The progressive component of *be going to* in Copley (2001) is actually the same as the progressive component here, but in the earlier paper I assumed it was the same as PROG, and I do not do so here.

perfective. Sections 3.3 and 3.4 both consider interactions between aspect and modality in these denotations. In section 3.3, it is found that the aspectual quantifier, or lack thereof, affects the modal properties of the sentence, indicating, among other things, a structure in which the aspectual quantifier takes the modal phrase as a propositional argument. Section 3.4 deals with an interaction between ordering and aspect to predict facts about *be going to*. Section 3.5 returns to *will* with a third reading, and presents a hypothesis about its meaning. The conclusion to the chapter is in section 3.6.

## 3.1 Ordering in futures

In chapter 2, I proposed that both progressives and generics involved the same universal circumstantial modal, and that this modal had two possible orderings. One possible ordering was inertial: I argued that Dowty’s (1979) inertia worlds, designed to deal with progressive modality, were a set of worlds provided by an inertial ordering on a metaphysical modal base (following Portner (1998), e.g.), and the account was extended to explain properties of generics as well. The other possible ordering was bouletic, where the person with the commitments was either the agent or some other contextually specified animate entity. Both progressives and generics seemed to have both bouletic and inertial readings, regardless of whether the readings were futurate or not. This led us to consider a unification of bouletic and inertial orderings; modals that use such orderings I call “boulertial.”

It seems unobjectionable to say that in futures, universal modality is also at work. In this section I argue that the universal modal at work in both *will* and *be going to* is the universal boulertial modal, the same one we saw in futurates. First we will sharpen our notion of inertia for use in futures, and then we will look at boulesis in futures.

### 3.1.1 Inertia in futures

Inertia worlds, if the reader will recall, were proposed by Dowty in order to allow a universal quantifier in the progressive to quantify over a set that was smaller than the set of all logically possible worlds. Of course the trick is in ruling in the right worlds and ruling out the wrong worlds; as Portner (1998) says, “a modal analysis is just as good as its definition of the set of relevant worlds.”

Let’s remind ourselves why the set of logically possible worlds won’t work. The sentence

in (96) can be true even if Jenny never actually finishes the circle later on.

(96) Jenny is drawing a circle.

Thus if a modal quantifier in the progressive were to quantify over the set of logically possible worlds, it would be unable to be a universal quantifier. This conflicts with our idea of the confidence which (96) seems to presuppose on the part of the speaker.

Dowty's solution is to define a set of inertia worlds, in which events proceed "normally". This idea is refined by Landman (1992), among others. Portner (1998) attempts to put this into a Kratzer-style modal semantics, as an ordering source.<sup>4</sup>

### 3.1.1.1 The Inertia Principle for futures

I proposed an Inertia Principle, as in (97), to flesh out the idea of events proceeding normally:

(97) *Inertia Principle*: The universe is committed to and can direct only the completion or continuation of eventualities that are already underway or whose compelling cause is underway.

This principle, combined with a bouletic modal, accounted for differences between bouletic and inertial orderings by putting restrictions on what the universe can want, as opposed to what an animate entity can want. The question before us now is whether it makes sense to have inertial orderings and direction presuppositions for futures.

An example will serve to show that we do. Suppose there is a ball at the top of a hill that has begun to roll down it. You and I are standing at the bottom of the hill. I might utter the prediction in (98):

(98) That ball will roll all the way down the hill.

Does this represent universal quantification over all the logically possible worlds? It cannot possibly do so. For instance, you might reply with (99):

(99) Oh yeah? Even if I run up and stop it?

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<sup>4</sup>One problem with these as ordering sources for the progressive, I argued in chapter 2, was that they do not account for cases in which an animate entity is presupposed to have control over what happens. This deficiency is remedied by the boulesis in my account.

If you did run up and stop it, the ball would not roll all the way down the hill. It is certainly logically possible that you might run and stop it, therefore if (98) was true in the context in which I uttered it, I must not have been quantifying over all the logically possible worlds.

This is extremely familiar behavior for modals, to only quantify over “normal” worlds (Kratzer, 1991). This is why, in evaluating the truth of (100) we don’t have to worry about the possible worlds in which aliens have spirited Cheryl away, even though we are using a universal quantifier.

(100) Cheryl must be at home.

We don’t want to rule the aliens out entirely. As Kratzer says, the actual world need not be a normal one. We take it to be extremely unlikely that aliens will show up (at least, I do), because we judge any possible causes of such an event to be quite unlikely. It is so unlikely that we can say that aliens *won’t* show up. If aliens *do* show up, what that means is that we either misjudged which causes had happened. This is familiar reasoning. Where it is in the current analysis is in the direction presupposition. That is why there is a biconditional there: the things the universe (or anyone else in charge) doesn’t want, don’t happen, as long as they are the entity in charge.

What I would like to suggest here is that the worlds that (98) is evaluated on are normal by virtue of an inertial ordering, that only picks out worlds in which what the universe wants, happens. What the universe wants, we said in chapter 2, is for eventualities that are already in progress, to continue or be completed. In this case the ball is already experiencing a rolling-down-the-hill eventuality, and so because of the laws of physics, the universe is committed to more rolling.

The worlds in which you run up and stop it are not considered in this set. This presumably is because you have not started doing it, and so the universe doesn’t want it. This means at the least we should add that the universe doesn’t want events to begin on their own spontaneously.<sup>5</sup>

### 3.1.1.2 A new Inertia Principle

I said at the beginning of this chapter that futures have different aspects, scoping over the modal as in futurates. If so, and if as we have seen, inertia and universal quantification are

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<sup>5</sup>In the context after you utter (99), however, I can conclude that you have an intention to run up and stop the ball. Thus once that is the case I can no longer truthfully assert (98).

involved in the modal in both futures and futurates, then what is the difference between them?

If  $ALL_b$  with inertial ordering appears in progressives, generics, *be going to*, and *will*, how do we make sure the inertial futures are allowed to have future eventualities, while the inertial progressives and generics do not? That is, why do (101a,b) have to refer to present or ongoing situations while (101c,d) do not, if they all have the same future component,  $ALL_b$ ? For if what the universe wants is only the continuation or completion of what is already in progress, (101c,d) should not be able to refer to future eventualities.

- (101) a. It's raining.  
       b. It rains.  
       c. It's going to rain.  
       d. It will rain.

So we have apparently gone too far in ruling out future reference in (101a,b) by way of an Inertia Principle — that is, if we want to use the same principle to account for readings of futures. The easiest solution to this problem, I believe, is to have two Inertial Principles, one for futurates and one for futures, reflecting two different orderings. This will get us the future reference in (101c,d); then we will try to determine whether we can justify this in the difference between futures and futurates that we have already given.

If we consider now which future eventualities we would like the universe to want in our new Inertia Principle, there is an obvious candidate. Surely a future eventuality whose cause has already occurred is something the universe wants. However, we need to be a bit careful here. As Ayer (1957) sums it up quite nicely, not all causes compel. There are non-compelling causes. For example, *sometimes* when I use Word 2000, Word 2000 causes me to become so angry that I hit the screen. Sometimes it doesn't cause me to become that angry. So in any situation where I am using Word 2000, it does not follow from the fact that I am using it that I will suffer Word rage. (We could say, though, that I *might* suffer Word rage, using something less than universal quantification.) Intuitively, it would not be right to say that the universe wants an eventuality to happen just because a non-compelling cause has occurred. We could say instead that the universe is okay with the eventuality happening.<sup>6</sup>

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<sup>6</sup>It behooves us as well to give a catalog of the different categories  $p$  might fall into with respect to

So this is our Inertial Principle for futures:<sup>7</sup>

- (102) *Inertia Principle for futures:* The universe “wants” and can direct only the completion or continuation of eventualities that are already underway, or for which a compelling cause has already occurred.

This is all fine. So now what about the difference between futurates and futures? We might consider going back saying that the temporal relation in  $SOME_t$  in inertial orderings has to be overlap rather than later than. But aside from the fact that as we have it set up now,  $SOME_t$  doesn’t take a director for an argument, this would not allow us to have futurates such as the one in (103), as we remarked in chapter 2:

- (103) The sun rises tomorrow at 5am.

Yet not every compelling cause allows us to truthfully utter a futurate about its result.

The difference between (103) and other examples like *\*It’s raining tomorrow* is that there is some predictability to the sun’s rising.

### 3.1.2 Boulesis in futures

We have dealt with inertia, and I have argued that it is essential to understanding futures. Now we will show the same of boulesis: cases where the director is animate.

Suppose you have a friend who does not always show up when she says she will. You are supposed to meet her at 5, but you are expressing doubt that she will show up. Another friend might say, to comfort you, the sentence in (104).

- (104) Don’t worry, she’ll be there at 5.

The other friend has two possible reasons for asserting this: he believes either that something about the universe that will ensure that she is there (she has something just before 5 in the

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the worlds maximally compatible with the universe’s desires. If an eventuality is already happening, or if a compelling cause for the eventuality has occurred already, we will say that the universe wants the eventuality (or its continuation or completion) to happen. If a non-compelling cause for an eventuality has happened, the universe doesn’t care whether the eventuality happens or not. It is okay either way. When the universe is *not* okay with the eventuality’s happening is no cause, compelling or non-, for the eventuality has occurred. Alternatively, if a compelling cause for the eventuality has occurred, the eventuality had better happen; the universe is not okay with the eventuality not happening. The same holds for if a compelling cause for something that precludes the eventuality has happened. Et cetera.

<sup>7</sup>Instead of boulerial ordering, what if people having intentions were viewed as non-compelling causes, and everything was under an inertial ordering? It seems to me that that does not give animate directors enough authority to justify the certainty we have that they can cause their plans to be carried out.

same room, she always walks by there at 5, etc.) or that some person will personally ensure that she is there, and has the power to do so.

If your forgetful friend says (105) and you believe her, and believe that she really directs that proposition, then that is all the assurance you need. If, though, you believe that she does not direct that proposition, perhaps because she is overly busy and distractible, you might not believe her.

(105) Don't worry, I'll be there at 5.

The ambiguity is clearer when these are embedded. Normally when someone utters (106), they presuppose that they are the director of their own actions. The speaker might continue with (106a). However, there is a reading in which the speaker presupposes that the universe is the director; i.e., the speaker believes that already existing properties of the speaker, or whatever, will cause the speaker to go to Harvard Square. In that case the speaker might continue with (106b).

(106) I think that I will go to Harvard Square tomorrow...

a. ...I've been meaning to get some shopping done.

b. ...that's just the kind of thing I might do.

The same ambiguity is available for *be going to* as well.

(107) I think I'm going to go to Harvard Square tomorrow.

The bouletic-inertial ambiguity also has something to say about a certain, somewhat archaic ambiguity (Leech, 1971). Many speakers, even some who do not normally use *shall*, find a difference between (108a) and (108b). (108a) is plausible, while (108b) might be said only by a person bent upon suicide:

(108) a. No one will help me; I shall drown!

b. No one shall help me; I will drown!

If *will* favors a bouletic, and *shall* an inertial reading, we can explain why. The *will* clauses express what the speaker intends (with a direction presupposition that it will come to pass), while the *shall* clauses simply express what will happen if the universe gets its way, presupposing that it will.



### 3.1.2.1 Fate-in-hindsight

One thing this bouleratial approach to futures sheds some light on is an observation made originally by Tim Stowell. The observation is that an overtly unrestricted *would* is false when the eventuality has not actually happened by the time of utterance. Indeed that is what (109a) entails, as is apparent from the fact that (109b) is something of a contradiction.

- (109) a. This little boy would grow up to be king.  
 b. # This little boy would grow up to be king, but he didn't.

The sentence in (109a) seems to convey somehow that at that past time, it was already fated that the boy would inevitably grow up to be king. Of course it need not have actually been inevitable at the time. I will call this effect fate-in-hindsight.

(110) Fate-in-hindsight:

$$\llbracket \text{would} \rrbracket^g(d)(p)(w)(t) \Rightarrow \llbracket \text{PAST} \rrbracket^g(p)(w)(t)$$

Here is how this approach affects our understanding of this effect. If I utter (109a), I presuppose that the universe directed *p* in the actual world at the past time in question (no other possible director in this context). I assert that it wanted *p* to happen. That means a compelling cause must have occurred. If that is so, and if I still believe it to be so at the speech time, then *p* must have happened; the universe wanted it to, and the universe, I presuppose, got what it wanted.

Even if the universe hasn't yet gotten what it wanted, it's still acceptable to use the past tense, as long as a compelling cause has occurred. Suppose all that is lacking is the actual coronation ceremony, which is taking place tomorrow; in such a situation, (109a) could be uttered quite felicitously. (See also Ippolito (2002) for more on this kind of mismatch between past morphology and future eventualities.)

This view of fate-in-hindsight entails that the universe can get demoted in the present, but not in the past. Animate directors, though, can get demoted in the past as well. I don't know why this should be so. They can also change their minds and so on, as in chapter 2, while the universe cannot.

In this section, I have presented evidence that both inertial and bouletic orderings are needed to account for the modality in both *will* and *be going to*. It is (almost) the same

modal, in fact, that we found evidence for in progressives and generics, in chapter 2. In the next section I demonstrate that, as in the futurate cases, there is aspect on futures.

### 3.2 Aspect in futures

There are three aspects that appear on futures: perfective, generic, and progressive. As mentioned above, in English bare  $ALL_b$  is pronounced as *will*.

- (111)  $ALL_b(d)(q)(w)(t) = 1$  iff  $\forall w'$  metaphysically accessible from  $w$  at  $t$  and maximally consistent with  $d$ 's desires in  $w$  at  $t$ :  $[q(w')(t)]$   
 Presupposed:  $d$  directs  $p$  in  $w$  at  $t$

This is the denotation we expect for generic *will*:

- (112)  $ALL_t(ALL_b(d))(SOME_{>}(q))(w)(t) = 1$  iff  $\forall t' \supset t: [\forall w'$  metaphysically accessible from  $w$  at  $t'$  and maximally consistent with  $d$ 's commitments in  $w$  at  $t'$ :  $[\exists t'' > t': [q(w')(t'')]]]$   
 Presupposed:  $d$  directs  $q$  in  $w$  at  $t'$

We should note right off that a generic future, despite its genericity, can be used to talk about a definite future time. Generic *will* would be expected to have the meaning that in all situations overlapping the present, a contextually specified director wants  $p$  at some future time. In (113) is an example of a generic future, with a definite time at which the snowing is to happen.

- (113) Don't worry, it'll snow tomorrow — it always snows on my birthday.

What is generic is the director's (in this case, the universe's) commitment to the snow. The eventuality itself, however, occurs at an existentially bound time.<sup>8</sup>

The progressive future is *be going to* and by hypothesis has the following denotation:

- (114)  $SOME_t(ALL_b(d))(SOME_{>}(q))(w)(t) = 1$  iff  $\exists t'$  that includes  $t: [\forall w'$  metaphysically accessible from  $w$  at  $t'$  and maximally consistent with  $d$ 's desires in  $w$  at  $t'$ :  $[\exists t'' > t': [q(w')(t'')]]]$   
 Presupposed:  $d$  directs  $q$  in  $w$  at  $t'$

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<sup>8</sup>As with generic futurates, but why do generic futurates require a definite time while these don't?

Now we will want to see if there is support for this three-way distinction among bare, progressive, and generic futures. The hardest part, in English at least, will be distinguishing bare *will* and generic *will*. There are two ways to do this: a present input to *will*, which is examined in section 3.2.1, and generic readings of indefinites, in section 3.2.2. Both of these should be possible with generic *will* but not with bare *will*. Present input should be possible with the progressive future *be going to*, but generic readings of subjects should not be.

### 3.2.1 Present input

Here we will see two kinds of evidence use present input to distinguish between perfective, progressive, and generic futures: embedding under *I can't believe (that)* (section 3.2.1.1), and contexts that rule out generic readings (section 3.2.1.2).

#### 3.2.1.1 Some unbelievable data

Consider for a moment the expression *I can't believe (that) p*. It has two readings: a literal reading, true if the speaker literally is unable to believe *p*, and an idiomatic reading, in which the truth of *p* is presupposed, and the speaker is only expressing amazement at the truth of *p*. For example, the literal reading of (115) might be used in a context where you have just met someone and want to express doubt that they in fact are married. The idiomatic reading might be used if you are at a friend's wedding reception, where you are in no doubt about whether he is married or not; you can use (115) to express your amazement about that fact.

(115) I can't believe you're married!

That the truth of *p* is presupposed in the idiomatic reading is shown by the fact that either a yes or a no answer to the question in (116) still commits the answerer to the proposition that the speaker is married.

(116) Can you believe I'm married?

In what follows, we will be interested in the idiomatic reading, precisely because of this presupposition. Since the presupposition is evaluated in the present, we expect *p* to be impossible when it lacks the subinterval property. This is indeed the case. A stative is

possible as in (115); futurates are possible as in (117a,b), generics are possible as in (117c), and past tense as well, as in (117d). Non-futurate readings of (117a) and (117b) are not possible. (Recall futurates are +SIP because their highest operator is  $ALL_t$  or  $SOME_t$ .)

- (117) a. I can't believe you are getting married next week!  
 b. I can't believe you get married next week!  
 c. I can't believe people get married all the time in this hall!  
 d. I can't believe you got married last week!

So *I can't believe (that) p* is a good way to detect whether the highest predicate in *p* has the subinterval property or not. Now, consider the cases in which *p* is a future sentence. We expect to be able to get the idiomatic reading with *be going to*, since it is progressive. The question then is whether *will* can get the idiomatic reading in (118b). It seems that it cannot.

- (118) a. I can't believe you're going to get married next week!  
 b. I can't believe you'll get married next week! #idiomatic reading

What this means is that the version of *will* being used in (118b) lacks the subinterval property. And yet sometimes *will* clauses can support the idiomatic reading of *I can't believe (that) p*. For example, suppose that Mary has just come out of the closet (on the idiomatic reading). Her grandparents, who we may suppose had been looking forward to attending her wedding, might utter (119) even if they accept Mary's life choice and merely wish to express their amazement that the wedding will never happen.

- (119) I can't believe Mary will never get married!

What can we say about this use of *will*? At the very least we may say that it is +SIP. I suspect this is a generic reading of *will*. Other present input evidence will point to this conclusion as well. We turn to present inputs in contexts that rule out generics.

### 3.2.1.2 Contexts that rule out generics

Since present input rules out the perfective reading, we expect that a context which has present input and which rules out the generic reading should not permit *will* sentences at

all. *Be going to* sentences, being non-generic, and having the subinterval property, should still be permitted.

If we carefully consider the question of which contexts might rule out generics, we see immediately that it is a tricky question. The point about generics is that they are assertable even in contexts where the eventuality described is not taking place. However, just because a context is compatible with the assertion of a generic, it does not follow that the generic is assertable only on the basis of the situation the speaker finds himself in. Suppose, for example, we are walking along in Scotland and we see a black sheep. From a situation such as the minimal one containing us and the sheep, we are clearly not entitled to conclude (120a). Somehow, *oh look!* at the beginning of the utterance highlights the sense that the only situation we are talking about is the current one. We could comment on the blackness of Scottish sheep, as in (120b), but then we would not be making a claim about the current situation.

- (120) a. # Oh look, all sheep in Scotland are black.  
b. Did you know, all sheep in Scotland are black.

Generic *will*, if that is what it really is, should work the same way. We expect generic *will* sentences to be infelicitous when it is in only a very small set of intervals overlapping the present that the universe or an animate director wants *q*, not in *all* intervals overlapping the present.

This turns out to be the case. If clouds have gathered and rain is imminent, we can use the progressive and say (121a), but not (121b).

- (121) a. Oh look, it's going to rain.  
b. # Oh look, it'll rain.

Likewise with (122) and (123):

- (122) a. Guess what? We're going to get married!  
b. # Guess what? We'll get married!
- (123) a. Oh, no! He's going to jump!  
b. # Oh no! He'll jump!

Where it is clear that it is on the basis of the way things generally are that we are speaking, rather than about the present situation, of course we can say things like (124).

(124) Don't worry, it'll rain.

As long as the perfective (bare) reading is ruled out by virtue of the present input, the only possible reading of *will* is the generic reading.

Next we will look at how indefinites are interpreted in futures; if they have different aspects, we should be able to see a difference.

### 3.2.2 Indefinites

As has been noted (Dowty, 1979; Diesing, 1992), generics allow generic readings of indefinites, while progressives do not. For instance, while (125a) allows a generic reading of the subject, making a claim of typical children, (125b,c) generally has only an existential reading for the subject, claiming that some kids are currently eating candy:

- (125) a. Kids eat candy.  
b. Kids are eating candy.

This is not to say that generic readings of bare plurals are always impossible with progressives; on the contrary, they are possible in the presence of a “related constituent” in the Carlson (1989) sense:

- (126) a. Kids are always eating candy.  
b. Kids are eating candy more and more these days.

What about perfectives? Perfectives, again, are hard to come by in English because it is difficult to distinguish them from generics; they both use the simple form of the verb. In a language that does distinguish them, however, such as Greek, perfectives do not allow a generic reading of indefinite subjects.

- (127) a. Ta pedhia trogane psomotiri.  
 D child eat.past.impf bread.with.cheese  
 ‘A child ate.impf bread with cheese.’  $\sqrt{\forall}, \sqrt{\exists}$
- b. Ta pedhia fagane psomotiri.  
 D child eat.past.pf bread.with.cheese  
 ‘A child ate.pf bread with cheese.’  $*\forall, \sqrt{\exists}$

If the quantifiers we have been treating as temporal quantifiers,  $ALL_t$  and  $SOME_t$ , are really situational quantifiers as I have been hinting, then there is an easy explanation for these facts. Generic readings stem from universal situational quantification (Kratzer, 1989) when the indefinite is interpreted in the restriction of the quantifier (Diesing, 1992). Progressives have an existential situational quantifier while generics have a universal situational quantifier, therefore it is natural that progressives should not get generic readings of bare plurals while generics do. If, though, a universal situational quantifier is added, as in the examples in (126), it becomes possible to get a generic reading of an indefinite in progressive sentences.

Like progressives, and unlike simple verb forms, *be going to* does not generally have generic readings in the absence of a “related constituent” in the sentence. On the other hand, *will* does license generic readings in those contexts. This is demonstrated in (128), which parallels (125) above: (128a) has a generic reading of the bare plural, about the tendency of kids to eat candy,<sup>9</sup> but (128b) makes only an existential claim.

- (128) a. Kids will eat candy.  
 b. Kids are going to eat candy.

As with progressives, generic readings of indefinite subjects in *be going to* sentences improve when there is a universal situational quantifier in the sentence. The sentence in (129a), for example, may be used to make a prediction that it will always be the case that kids will be candy-eaters.

- (129) a. Kids are always going to eat candy.  
 b. Kids are going to eat candy more and more in the coming weeks.

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<sup>9</sup>There are actually two readings here, one with generic *will* (kids just generally eat candy) and one with dispositional *will* (kids will eat candy if you offer it to them). I will postpone discussion of dispositional *will* until section 3.5.

These facts can be explained if *be going to* and PROG both contain SOME<sub>t</sub>, and generic *will* and GEN both contain ALL<sub>t</sub>. The similarity between *be going to* and PROG on the one hand, and generic *will* and GEN on the other, thus provides some initial support for the hypothesis.

We expect bare *will* not to be able to get generic readings for indefinites. Consider the overtly unrestricted (hence generic) sentences in (130). These all permit generic readings of the subject.<sup>10</sup>

- (130)
- a. Children will eat candy.
  - b. Furniture will be provided.
  - c. Children will get sick every now and then.
  - d. People not wearing shoes will be denied admittance.
  - e. Elephants will be coaxed through flaming hoops.

However, if we add the right kind of restriction to rule out the generic reading and allow the bare reading of *will*, only the existential reading of bare nominals is possible.

- (131)
- a. If you hand out candy tomorrow, children will eat it.
  - b. If you are renting the unit, furniture will be provided at the beginning of the rental period.
  - c. If we don't get this village some vitamins, children will get sick tomorrow.
  - d. If we don't correct this blatant instance of discrimination soon, people not wearing shoes will be denied admittance.
  - e. If we don't do something quick, elephants will be coaxed through flaming hoops.

This too is evidence that there are two kinds of *will*: generic and aspectless (which appears so far to behave like ALL<sub>b</sub> is -SIP).

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<sup>10</sup>Interesting fact: if you put a definite temporal adverbial in, bouletic orderings retain the generic reading of the bare nominal, but inertial orderings do not:

- i. Diplomas will be presented on June 9th. ( $\forall, \exists$ )
- ii. Children will get sick tomorrow. ( $*\forall, \exists$ )



### 3.2.3 Summary

In this section I presented evidence for three aspectual values of futures. The evidence was in the form of present input, which disallows perfectives but allow generics and progressives, and generic readings of bare subjects, which only occur with generics.

Now that we have spent some time determining some of the modal and aspectual properties of futures, I would like to concentrate on interactions between modal and aspectual properties of futures in the next two sections. First, in section 3.3, I demonstrate that the aspectual operator in futures, or the lack of one, constrains the accessibility relation of the modal operator. In section 3.4, I show that aspect constrains the choice of ordering source.

## 3.3 Aspect constrains the accessibility relation

Here I lay out some facts that reinforce the analysis of *be going to* as a progressive future, and indicate that the proposed progressive operator  $SOME_t$  in the denotation of *be going to* affects the future modal  $ALL_b$ .<sup>11</sup> We begin with a puzzle about offering.

Driving along the highway in California one day, I saw a billboard advertising a mechanic's shop in Madera. It included the sentence in (132a). The puzzle is: Why couldn't it instead have included the sentence in (132b)?

- (132) A sign seen (and one not seen) on the highway
- a. We'll change your oil in Madera.
  - b. # We're going to change your oil in Madera.

The property of the context that is relevant here is that the author of the billboard is making an offer. The difference between (136a) and (136b) seems to be that *will* can be used to make an offer, while *be going to* cannot; (136b) sounds more like the author of the billboard is informing the motorist of a fact, or indeed making a threat, rather than making an offer. So the puzzle becomes: Why can't *be going to* be used to make an offer?

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<sup>11</sup>As we will see in chapter 4, some of the same tests for aspect constraining the accessibility relation can be done with futurates as well; it is easier to show it with the futures first, however.

### 3.3.1 The pragmatics of offering

Suppose we consider in more depth what it is to make an offer. There are three issues to consider: the contribution of the speaker, the contribution of the hearer, and temporal restrictions.

First, the speaker. It seems clear that only someone who believes they can control whether an eventuality happens or not can felicitously make an offer for that eventuality to happen. I cannot offer for it to rain tomorrow, for instance, because I have no authority over the weather, and I know it. This concept is familiar from our discussion in chapter 2 about futurates; we defined it in the form of *direction*, as below:

- (133) An entity *d* *directs* a proposition *p* in *w* at *t* iff  $\forall t'$  that include *t*:  
 $\forall w'$  metaphysically accessible from *w* at *t'* and maximally consistent with *d*'s commitments in *w* at *t'*:  
 $[\forall w''$  metaphysically accessible from *w* at *t'*:  
 $[\exists t' > t': [p(w')(t'')] \Leftrightarrow \exists t''' > t'': [p(w'')(t''')]]]$

So in order for an individual *d* to be able to make a valid offer to carry out a eventuality of which *q* holds, *d* must direct *q*. (In which world(s) and at which time the speaker should direct *q* is as yet not clear; we will get to that question shortly.)

The hearer, whom I will refer to as *h*, also seems to have some control over whether the *q*-eventuality occurs. It should happen if *h* wants it to happen, and, equally importantly, it should not happen if *h* doesn't want it to happen.<sup>12</sup> It would certainly be rude for someone to make an assertion that entails that in some worlds where you do not want them to change your oil, they do it anyway. For an utterance to count as an act of offering, the speaker's carrying out of the offered eventuality has to be contingent on the interlocutor's preferences.

Could we say then that *d* and *h* both direct *q*? In a way, that is true, but it is significant that *h* only ends up directing *q* as a consequence of *h*'s desires being important to *d*. To put it another way, the fact that *d* directs *q* is presupposed, while the proposition that *h* directs *q* is what is asserted. Let's treat a sentence of offering as a conditional with an elided antecedent *if you want q*, an overt consequent *will q*, and a presupposition that *d* directs *q*. And let us further say that in making a valid offer, *d* is also committed to the truth of the proposition expressed by the conditional *If you don't want q, won't q*.

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<sup>12</sup>On the neg-raising reading of *doesn't want*, of course.

There is one point now to make about temporal interpretation of these elements. The antecedent and the consequent of both conditionals must all have the same time of evaluation; the time at which *h* wants, or doesn't want, *q* must be the same time that *d* is prepared to carry out, or not carry out, *q*. What matters for the offer is not whether you want *q* now, but whether at some non-past, contextually salient time, you want *q*. To show this, let's suppose that someone says she will bring you food tomorrow if you are hungry now, and won't if you are not hungry now. But perhaps you are full now; that means the speaker will not bring you any food tomorrow. Under the assumption that your being hungry now does not have anything to do with whether you are hungry tomorrow, this speech act, according to what we have said, turns out not to be an act of offering, which is intuitively correct.

Let's assume the following pragmatic condition on acts (speech or otherwise) that are offers.

- (134) *Condition on offers*: A person *d* has offered in *w* at *t* to bring about *q* for *h* only if *d* believes that for all worlds *w'* metaphysically accessible from *w* at *t*: there exists a time *t'*: *d* directs *q* in *w'* at *t'*; for all times *t''* later than *t'*: for all worlds *w''* maximally compatible with *h*'s commitments in *w'* at *t'*; for all worlds *w'''* metaphysically accessible from *w'*, *t'*:  $q(w'')(t'') \Leftrightarrow q(w''')(t'')$

Leaving out the worlds and times we can abbreviate this condition as follows:

- (135) A person *d* has offered to bring about *q* for *h* iff *d* believes *d* directs *q* and:
- a. If *h* wants *q*, *q*.
  - b. If *h* doesn't want *q*, not-*q*.

This characterization of the offering context will now allow us to determine what the problem is with using *be going to* in an offering context.

### 3.3.2 Back to the billboard

Returning to our billboard, we can now say that in order for the author of the billboard to truly be making an offer, they must be able to consistently assert both of the following:

- (136) a. If you want us to change your oil in Madera, we'll change your oil in Madera.  
b. If you don't want us to change your oil in Madera, we won't change your oil in Madera.

According to our assumption, offering utterances have an antecedent whether or not it is pronounced. In that case, the billboard utterances actually have the meaning of the conditionals given in (137):

(137) Revision of the billboard utterances

- a. (If you want us to change your oil in Madera,) we will change your oil in Madera.
- b. # (If you want us to change your oil in Madera,) we are going to change your oil in Madera.

Now we have another way to restate our puzzle. The conditional in (137a) is identical to the conditional in (136a). The speaker of (137a) can of course also assert (136b), which fits nicely with the intuition that a *will* sentence can be an offer, because in order to make an offer, one must be able to assert both (136a) and (136b).

As for *be going to*, (137b) is, like (132b), infelicitous. This ought to be because the speaker of (132b) cannot also assert both (136a) and (136b), the conditions on offering. In fact, there seems to be no problem with the speaker of (132b) asserting (136a). Rather, the problem seems to be that the speaker of (132b) cannot then agree with the statement in (136b). So the final version of our puzzle is: Why wouldn't the speaker of (137b) be able to agree with (136b)?

Before we answer this question, let us note that it is not only English that has this property; the Indonesian and Turkish futures behave similarly. For example, the sentences in (138a) and (139a) could be used to respond to "I need a volunteer. Who will make coffee?" The sentences in (138b) and (139b) could not, unless the answerer was already going to make coffee regardless of what the asker wanted.

(138) Turkish

- a. Ben kahve yap-ar-ım.  
I coffee make-aorist-1sg  
'I'll make coffee.' offer ok
- b. Ben kahve yap-acağım.  
I coffee make-future-1sg  
'I'm going to make coffee' #offer

(139) Indonesian

- |    |  |          |
|----|--|----------|
| a. | Saya akan membuat kopi.<br>I     akan make     coffee<br>'I'll make coffee.'       | offer ok |
| b. | Saya mau membuat kopi.<br>I     mau make     coffee<br>'I'm going to make coffee.' | #offer   |

The puzzle is therefore not just a puzzle about futures in English, but about futures in other languages as well. If it can be explained, we will have gained knowledge about available means of future reference in a number of languages.

### 3.3.3 Proposal

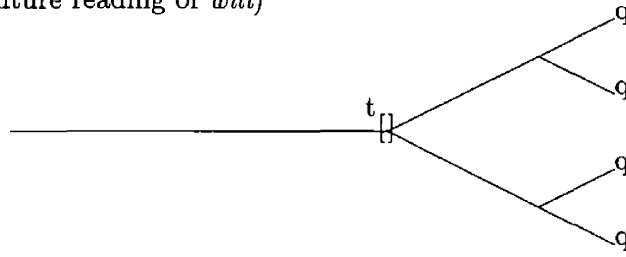
Let's return to English, and to the version of the billboard puzzle we ended with: Why wouldn't the speaker of (137b) agree with (136b)?

As promised, my answer to this puzzle will rely on an aspectual difference between *be going to* and *will*. Let us assume, as I suggested in the introduction to this chapter, that *be going to* involves the progressive operator  $SOME_t$ , plus the universal bouleratial modal  $ALL_b$ , lower in the structure. Assume as well that *will*, in these cases at least, is just  $ALL_b$ . Using these assumptions, along with what we have learned about offering contexts, we will be able to explain why offers can be made with *will* but not with *be going to*.

Consider *be going to*, which by hypothesis is  $SOME_t + ALL_b$ .  $SOME_t$ , evaluated at  $t$ ,  $w$ , and  $p$ , yields a truth value of 1 just in case  $p$  holds over a superinterval  $t'$  of  $t$  in  $w$ , where  $t$  is an internal interval of  $t'$ . *Be going to* represents a case where  $p$  is  $ALL_b(d)(q)(w)(t')$  (for some  $d$ ,  $q$ ). This means that the worlds *be going to* quantifies over are not just the set of worlds  $ALL_b(d)(q)(w)(t)$  quantifies over, i.e., those that are maximally compatible with what  $d$  wants at  $t$ , but a larger set of worlds: the worlds that are maximally compatible with what  $d$  wants for some interval surrounding  $t$ .

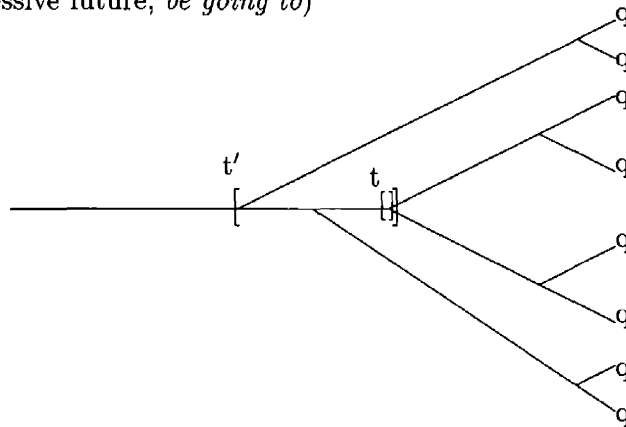
Suppose we depict the differences between these two sets graphically. Let the horizontal line in the diagram below represent the actual world. The lines branching off represent the worlds maximally consistent with what the director wants at the time of branching. If, for some  $d$ ,  $q$ ,  $ALL_b(d)(q)(w)(t)$  is true, that means that all the worlds branching off during time  $t$  are  $q$  worlds.

- (140) A case where  $\text{ALL}_b(d)(q)(w)(t)$  is true  
 (bare future reading of *will*)



Now consider *be going to*. The temporal argument of  $\text{ALL}_b$  is not  $t$ , but some larger interval  $t'$ . The worlds quantified over are those that are maximally consistent with what the director wants at the interval  $t'$ . We would represent the worlds *be going to* quantifies over as below in (141). If  $\llbracket \text{be going to} \rrbracket^g(d)(q)(w)(t)$  is true, that entails that all the worlds pictured branching off during  $t'$  are  $q$  worlds, as shown.

- (141) Worlds quantified over by  $\text{SOME}_t(\text{ALL}_b(d)(q))(w)(t)$   
 (progressive future, *be going to*)



*Be going to* therefore quantifies over not only the worlds that bare *will* would quantify over given the same arguments, but also over additional worlds. The additional worlds are those that branch off during  $t'$  but before  $t$  (the fact that  $t$  is not an initial interval of  $t'$  guarantees that there *are* worlds that branch off in  $t'$  but before  $t$ ).

### 3.3.4 Explaining the puzzle

We are now in a position to return to the puzzle about offering, and explain why the speaker of (137b) (i.e., the billboard *be going to* utterance with the elided antecedent made explicit) cannot also consistently assert (136b), both repeated below in (142).

- (142) a. # If you want us to change your oil in Madera, we're going to change your oil in Madera. (= (137b))  
 b. If you don't want us to change your oil in Madera, we won't change your oil in Madera. (= (136b))

Let:

- (143) p = the proposition expressed by *you want us to change your oil in Madera* (in the context in question)  
 q = the proposition expressed by *we change your oil in Madera* (in the context in question)  
 t = a time non-past with respect to the reading of the billboard

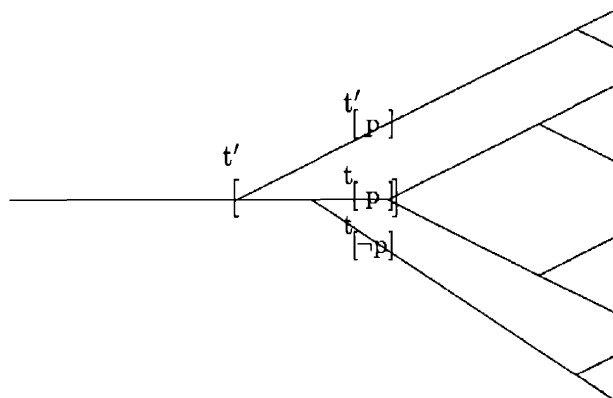
(137b) and (136b), the incompatible utterances from the puzzle, turn out as follows. As far as temporal concerns, let us sidestep the issue and just consider those worlds at which p is true at some time, and call the time at which p is true, t. We will assume that t is also the argument of the consequent. I argued above in section 135 that offering contexts demand this state of affairs, which is all we need for the time being. We will put off a detailed discussion of the relative temporal interpretation of antecedents and consequents until chapter 4.

- (144) a.  $p(w)(t) \Rightarrow \text{SOME}_t \text{ ALL}_b(d)(q)(w)(t)$  (= (137b))  
 b.  $\text{not-}p(w)(t)=0 \Rightarrow \text{ALL}_b(d)(\text{not-}q)(w)(t)$  (= (136b))

Now we will see how the current proposal derives the intuition that (144a) and (144b) are incompatible, solving the puzzle. Suppose now we consider one of the worlds in which p is true at t. We can imagine possible worlds in which p is not true at t (i.e., worlds in which not-p is true at t, assuming contradictory negation, for the sake of simplicity). These worlds branch off before t. Of course, not all of the worlds that branch off before t are worlds that make not-p true at t; some of the worlds that branch off before t make p true

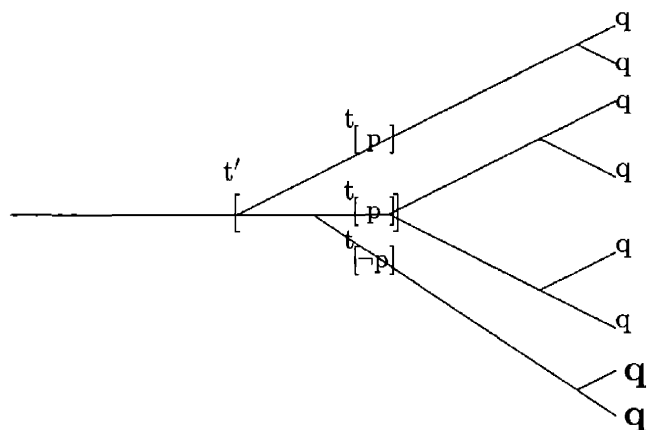
at  $t$ . In general, for any interval  $t'$  which properly includes  $t$ , there will be some worlds that branch off from the actual world during  $t'$  such that  $\text{not-}p$  is true at  $t$ . This state of affairs is represented in (145) below.

(145)



Now, let us further suppose that (144a) is true. Therefore on any world that makes  $p$  true at  $t$ , there is an interval  $t'$  such that all the worlds that branch off during  $t'$  make  $q$  true at some later interval. This state of affairs is given below.

(146)



But now notice that in a situation in which (144) is true — that is, in which there is an interval  $t'$  including  $t$  such that all worlds branching off during  $t'$  have  $q$  true at some later time — there can still be  $\text{not-}p$  worlds among these  $q$  worlds. Two such worlds in the diagram above are those with boldface, larger  $q$ . The existence of such worlds is inconsistent

<sup>12</sup>This is where it is important that  $t$  not be an initial subinterval of  $t'$ ; if it were, there would be no difference in the sets of worlds quantified over.



with the condition in (144b) that all not-*p* worlds are worlds in which not-*q* will happen (assuming that *q* and not-*q* are inconsistent). That, then, is why *be going to* sentences like the billboard sentence in (132b) can't be used to make an offer. This incompatibility with a condition on offering explains the infelicity of a *bgt* sentence such as (132b) in this context, and is the correct characterization of the puzzle.

That this is the right approach to the puzzle becomes clear when we consider contexts in which not-*p* worlds are assumed to be non-existent. In these contexts, *be going to* sentences suddenly don't sound so rude. Consider, for example, another possible billboard (suppose you are already in Madera):

(147) We're going to make you happy in Madera.

It is safe for the speaker to assume that there are no not-*p* worlds; that is, conceivably there are no possible worlds in which you don't want to be happy. The utterance of (147) doesn't entail that any not-*p* worlds are *q* worlds. Hence no contradiction emerges.

The puzzle we began with, i.e., that *be going to* cannot be used to make an offer, provided empirical support to the proposal that this construction involves two ingredients: progressive aspect and a future modal. Indeed the semantic result of composing these two operators is incompatible with what it means to make an offer.<sup>13</sup>

Thus we have seen that an aspectual difference between *will* and *be going to* can account for modal differences between them. The modal semantics are the same, but because there is a temporal input to the accessibility relation, a difference in aspect means a difference in the set of worlds quantified over by the modal. In this case we saw that a progressive future conditional *If p, q* will typically entail that some not-*p* worlds are *q* worlds, while a bare future conditional will not have such an entailment.

We will have a lot more to say about this mechanism in chapter 4 when we discuss futures in conditionals. In the meantime, though, let us continue our investigation into

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<sup>13</sup>So far we have dealt with future *will*. We know that *will* has a second meaning or use, often referred to as "dispositional". The sentence in (i) has a reading on which what is claimed is not that John, at some point in the future, will eat beans, but rather that he is generally willing or disposed to eat beans. *Be going to* apparently cannot express anything about John's dispositions; (ii) can only be a claim about the future.  
 (i) John will eat beans.  
 (ii) John is going to eat beans.

The question that arises at this point is whether the difference between *will* and *be going to* in offering contexts is rather due to the availability of dispositional readings, since plausibly making an offer might have something to do with being willing to follow through on the offer. When we look at languages other than English, as we shortly will in section 3.5.4 below, we discover that such a unified account is actually undesirable.

aspect on futures by comparing two different aspectual values of *will*: bare *will* and generic *will*.

### 3.4 Aspect constrains the choice of ordering

We have just seen one way in which aspect and the bouleratial modal interact in futures: the aspect constrains the accessibility relation. Here I demonstrate that aspect constrains the choice of inertial or bouletic ordering.

For some reason, only inertial readings are possible with past generics. Bouletic readings are not possible. This is the case for both ordinary generics and generic futurates:<sup>14</sup>

- (148) a. # Sally handled the mail from Antarctica, but none ever came.  
b. # John always left the next day, but he always ended up changing his mind.

This is true of *would* as well, though something like a past bouletic *would* seems to have been possible earlier in the history of the language:

- (149) This little boy would grow up to be king.  
a. fate-in-hindsight (inertial): that's what eventually would happen  
b. # bouletic: that's what he wanted to happen, and it did (?)

However, with progressives, both ongoing and futurate readings are possible with bouletic ordering, as in (150) and (151) respectively:

- (150) Mary was building a house, but she didn't end up finishing it.  
(151) a. The Red Sox were playing the Yankees tomorrow.  
b. # The Red Sox were defeating the Yankees tomorrow.  
(152) The Red Sox were going to play the Yankees. (ok on both inertial and bouletic readings)

One thing worth noting about (151) is that futurate readings are the dead giveaway for boulesis. As long as we stay away from repetitive eventualities that behave like clockwork (like the time of the sunrise), any futurate we find — anything that cares whether a director

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<sup>14</sup>Embedded under a higher past operator (Sequence of Tense) these all improve.

can direct the eventuality — must involve a bouletic ordering rather than an inertial one, and thus it will matter whether the eventuality is plannable or not, as in (151). This is the futurate pattern of judgments: good with plannable eventualities, bad with unplannable ones.

So: while bouletic ordering is available for past progressives, it is not available for past generics. Carrying this unexplained fact over into the current discussion, this means that we should expect *was/were going to*, to allow bouletic readings in the past, but not *would*.

Determining whether our expectation is borne out is not trivial. According to the denotations we gave for progressive and generic futures, the eventuality does not have to overlap the present in inertial readings (unlike the situation for progressive futurates). This accounted for why even unplannable eventualities are acceptable in futures, as in (153b).

- (153) a. Pedro is going to/will pitch tomorrow.  
 b. Pedro is going to/will pitch a perfect game tomorrow.

This being the case, it is difficult to see whether there is bouletic orderings are possible at all. The way to proceed is to find ways to rule out the inertial readings, so that we are left with bouletic readings. If we can do this, we should be able to see the pattern of judgments typical of futurates. In contexts where the inertial reading is ruled out, we expect to find the futurate pattern of judgments in *was/were going to* sentences, but we expect *would* sentences to be ungrammatical. Two ways of ruling out inertial readings, as we will see below, are durative clause-initial adverbials with past tense sentences, and contexts where fate-in-hindsight is ruled out. We consider them in turn.

### 3.4.1 Durative adverbials

Futurate readings, but not inertial readings, can have a clause-initial durative adverbial constraining not the time of the eventuality, but the time at which the director wanted the eventuality to happen. We see the futurate pattern of judgments in (154):

- (154) a. For several days, Nomo was pitching against the Yankees  
(next Thursday).
- b. # For several days, Nomo was pitching a perfect game against the  
Yankees (next Thursday).

For some reason this is not possible with present tense futurates, as in (155), so again, we will be limiting ourselves to *wgt* and *would*.

- (155) \* For several days, Nomo is pitching against the Yankees  
(next Thursday).

It turns out that *was/were going to* can appear with durative adverbials only when the eventuality is plannable:

- (156) a. For a long moment, Nomo was going to throw a fast ball.
- b. # For a long moment, Nomo was going to catch a cold.

The same sentences with *would*, on the other hand, do not support these clause-initial durative adverbials:

- (157) \* For a long moment, Nomo would throw a fast ball/catch a cold.

So as predicted, *was/were going to* allows only the futurate pattern of judgments with a clause-initial durative adverbial, and *would* allows no reading at all. Our prediction was based on the behavior of progressives and generics, and thus its realization provides evidence that a similar aspectual contrast distinguishes *be going to* and generic *will*.

### 3.4.2 Changes of plans

The second environment in which we can detect boulesis in *was/were going to* has to do with contexts where fate-in-hindsight is ruled out. Recall fate-in-hindsight; it was a property of sentences like (109a) that the eventuality had to have happened by the speech time (or something), as demonstrated in (109b) (both repeated here as (158a,b)).

- (158) a. This little boy would grow up to be king.
- b. # This little boy would grow up to be king, but he didn't.

I explained this by saying that *would* presupposes a director who, at a past time, directed and wanted p. In this context it could only be the universe. If the universe wanted p, a compelling cause must have happened, so the boy's kingdom is, at the speech time, a done deal.

What about bouletic orderings? Suppose a bouletic reading were possible for (158a) (we have seen that it isn't). If an animate director wants p, all that means is that they want (are committed to) p. It doesn't mean they can't change their mind. The universe, on the other hand, really cannot change its mind. It can only be committed p when a compelling cause has happened, and then it can't forget about the compelling cause and become un-committed. Also, as mentioned above, people can get demoted.

Let's codify these properties as a "Boulesis Principle:"

- (159) *Boulesis Principle.* Unlike the universe, people can change their minds, or have what they wanted in the past not work out, even if they were director at the time.

Because of the Boulesis Principle, if a bouletic reading for a past future is available, we would expect to be able to deny that the eventuality actually happened. And because such a denial rules out the inertial reading, as in (158b), we should see the futurate pattern of judgments, where plannable eventualities are good and unplannable ones are bad. This is exactly what happens with *was/were going to*, where as we know, the bouletic reading is possible. Whether the director changes their plans (as in (160)) or gets demoted (as in (161)), the futurate pattern of judgments is revealed.

- (160) a. Pedro was going to pitch the following day, but then the manager decided to put Lowe on the mound instead.  
 b. # Pedro was going to pitch a perfect game the following day, but then he decided to allow three hits.
- (161) a. Pedro was going to pitch the following day, but then he caught a cold and didn't.  
 b. # Pedro was going to pitch a perfect game the following day, but then he caught a cold and didn't.

The more unlikely it is that a person could plan such an eventuality, the worse the examples become.

- (162) a. # It was going to rain, but it didn't.  
 b. # He was going to get well, but he didn't.

This shows again that when inertial readings are ruled out and bouletic readings in principle should be available in progressive futures, they are in fact available.

### 3.4.3 Summary

Since *be going to*, like PROG, allows past bouletic readings, while *will*, like GEN, does not, we have more evidence that futures have aspect that interacts with the modality.

In the next section we change gears to account for a third reading of *will*: so-called dispositional *will*.

## 3.5 Dispositional *will*

There is a third reading of *will* that has been mentioned in the literature, which we have not yet discussed: dispositional *will*. This use of *will* seems to have a different meaning from the two other *will*s analyzed above. The dispositional reading of (163a) conveys that John is willing to eat beans. (163a) also has a generic reading; this reading is brought out in (163b), which lacks the dispositional meaning.

- (163) a. John will eat beans.  
 b. John will eat beans tomorrow.

In this section I will argue that dispositional *will* is a special case of generic *will* with a particular kind of (usually covert) antecedent attaching to ALL<sub>t</sub>, and any overt antecedent an argument of ALL<sub>b</sub>. Thus it is like generic *will* in some ways and unlike it in others. Data from Indonesian confirms that the two do not always travel together.

### 3.5.1 Genericity in dispositional *will*

Like generic *will*, dispositional *will* can take present input, indicating that it has a temporal (really situational) quantifier, and permits generic readings of indefinite subjects, indicating that that temporal quantifier is ALL<sub>b</sub>.

Embedding under *I can't believe (that)* is fine, showing that a presupposition evaluated at the present is fine.

(164) I can't believe Mary will eat beans these days!

Dispositional *will* also need not be embedded.

(165) Mary will eat beans these days.

These facts make sense only if either  $SOME_t$  or  $ALL_t$  is in the denotation. It's actually  $ALL_t$  and here's why. As we saw above,  $ALL_t$ , but not  $SOME_t$ , licenses generic readings of bare plural subjects. Consider the sentence with a bare plural subject in (166):

(166) Dogs will eat doughnuts.

There are three readings of this sentence. The bare *will* reading, as we expect, says that there will be an instance of some dogs eating doughnuts. The bare plural can only get an existential reading on the bare *will* reading. The generic *will* reading, which we have also seen, says that in general, dogs will, every now and then, eat doughnuts, and there's no way to stop them. It seems to be false; I know of no dog who goes around eating doughnuts. On the other hand, the dispositional *will* reading says something along the lines of, if you give a dog a doughnut, it will eat it. That is quite different from the generic reading, and I think true (though I haven't tried it). But as in the generic *will* reading, the bare plural gets a generic reading with dispositional *will*. This allows us to conclude that  $ALL_t$  is a component of dispositional *will*.

### 3.5.2 Dissimilarities with generic *will*

There are, in fact, a number of differences between generic *will* and dispositional *will*.

First, the covert *if you give it to them* that seems obligatory on dispositional *will* is important. Also, as I said above, dispositional *will* is incompatible with anything that marks a specific eventuality, as in (167), although it allows a generic *will* reading:

(167) John will eat beans tomorrow.

This is perhaps related to the fact that (168) on the generic reading can have either an existential or universal subject (Carlson, 1995), but the existential one is much better with the adverbial.

(168) Dogs will eat doughnuts (tomorrow).

I have no explanation for this fact, but it is suggestive.

We might expect that something called “dispositional” might be impossible with inanimate subjects. This is not so, but the facts around inanimate subjects in dispositional *will* point to another difference between dispositional and generic *will*. Inanimate subjects are fine with dispositional *will* as well as generic *will*, but the dispositional part has to do with inherent properties of the subject, as in (169a). The sentence in (169a) is true or false in part because of properties of hydrangeas. Compare with a generic reading, which does not. I can utter (169b) as a prediction, which has nothing to do with any inherent properties of hydrangeas. If I know that aliens will land and plant hydrangeas next spring here and keep them alive with special techniques, I would still be able to utter (169) in good faith.

- (169) a. Hydrangeas will grow to a height of 5 ft. in this area.  
b. Hydrangeas will grow here next spring.

Dispositional *will* is even compatible with passives, as long as it is an inherent property of the subject that is a compelling cause for the eventuality to happen.

- (170) Chocolate cakes will be eaten (if you just leave them lying around).

So while dispositional *will* does not require an animate subject or agent, it still differs from generic *will* in that the inherent properties of an inanimate subject must be a compelling cause for the eventuality.

Another difference between dispositional *will* and generic *will* has to do with the location of a restricting *if*-clause. We will use donkey anaphora to fix the location. Consider for example the sentence in (171), with a sentence-final *if*-clause. This sentence has the reading in (171a), in which the bare plural gets an existential reading. For the most part it lacks the reading in (171b), in which *potatoes* has a generic reading.

- (171) Marissa will eat potatoes if you put cheese on them.  
a. To get Marissa to eat some potatoes, I advise you to put cheese on them.  
b. # Potatoes are such that if you put cheese on them, Marissa will eat them (so don't put cheese on them if you don't want her to eat them).

It is, though, possible to get the reading in (171b) if we are, for instance, answering the question, “I remember that there was something I shouldn't put cheese on if I didn't want



Marissa to eat all of it; what was it again?”<sup>15</sup> That is, *potatoes* needs focus marking in order to get the reading in (171b).

However, if we use a clause-initial *if*-clause, the situation is different. The reading in (171b), repeated in (172b), is much easier to get than the reading in (171a), repeated as (172a).

(172) If you put cheese on potatoes, Marissa will eat them.

- a. # To get Marissa to eat some potatoes, I advise you to put cheese on them.
- b. Potatoes are such that if you put cheese on them, Marissa will eat them (so don’t put cheese on them if you don’t want her to eat them).

Again, (172a) is possible in a marked context, in this case if the speaker is answering the question, “Under conditions will Marissa eat potatoes?” That is, *potatoes* must have topic marking. (cf. Rooth 1995)

### 3.5.3 Hypothesis

The facts to be explained about the meaning of dispositional *will* are as follows:

- Why does it allow generic readings of indefinites?
- Why the covert *if*-clause?
- (Why is there a temporal specificity effect?)
- Why subject-bouletic or subject-inherent properties?
- Why does the position of *if*-clause matter?

The possibility for generic readings of indefinites means there is a high generic operator, i.e., ALL<sub>t</sub>.

The need for a hedge — *if you offer, if you let them, if the conditions permit it* — is missing from any other future we have talked about so far. Let’s say this antecedent has

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<sup>15</sup>Norvin Richards (p.c.) points out that it is easier to get the generic reading of *potatoes* as in (171b), in the sentence in (i):

(i) Bugs will eat potatoes if you don’t spray them.

an existential boulerthial modal  $SOME_b$ , modelled on  $ALL_b$ . The director is the universe or an animate entity; which one it is can be detected by what the hedge is.

What about the consequent? Perhaps, in all situations overlapping the present in which it is permitted (by some higher power) for the subject to do  $q$ , the subject does  $q$ . But this is not quite right. There is nothing here about the dispositions, or inherent properties, of the subject. The fact that we are talking about dispositions and inherent properties suggests that a boulerthial modal phrase is in the consequent as well. The subject, if animate, gets to choose whether to do  $q$  or not. If inanimate, inherent properties do the “choosing”. This is universal;  $ALL_b$ , with higher director  $d$  as either an animate entity or the universe.

If we redefined  $ALL_t$  to take two propositional arguments, we get the following meaning for dispositional *will*:

- (173) In all times (situations) in which it is permitted by  $d$  that  $d'$  (the subject of  $q$ ) directs  $q$ ,  $d'$  wants  $q$ .  
 Presupposed:  $d$  directs whether  $d'$  directs  $q$ .

### 3.5.4 Facts from Indonesian

In Indonesian, neither *akan* (*woll*) nor *mau* are really felicitous in generics or conditionals. (That in itself is interesting.) Yet *mau* (the progressive future) has dispositional readings. Calling *mau* a progressive future is based on the fact that *akan* can be used to make an offer, and *mau* cannot.

- (174) a. Saya akan membuat kopi.  
           woll make coffee  
           ‘I’ll make coffee.’ offer ok  
       b. Saya mau membuat kopi.  
           be going to make coffee  
           ‘I’m going to make coffee.’ #offer

Also, *mau* can have present input, while *akan* cannot:

- (175) a. # Aduh, akan hujan.  
           Oh.look woll rain  
           ‘Oh look, it’ll rain’
- b. Aduh, mau hujan.  
           Oh.look, be going to rain  
           ‘Oh, it’s going to rain.’

In these respects it appears that *akan* is much like *will* (*woll*, really, since there is no present tense marked in Indonesian) and *mau* is much like *be going to*. However, when we turn to the possibility of dispositional uses, the situation is reversed. It is *mau* that has a dispositional use, not *akan*.

- (176) a. Ali akan makan ikan.  
           Ali woll eat fish  
           ‘Ali will eat fish (later)’  
           \*‘Ali is willing to eat fish.’
- b. Ali mau makan ikan.  
           Ali be going to eat fish  
           ‘Ali is going to eat fish.’  
           ‘Ali is willing to eat fish.’

Thus generic and dispositional futures are not the same thing, supporting the analysis given above. In Indonesian, the question that arises now is whether the Indonesian dispositional *mau* is generic or progressive; later research will answer this question.

### 3.6 Conclusion

In this chapter I have introduced a semantic classification of future morphemes into progressive, generic, and bare futures. Aspect was shown to have detectable effects on the worlds quantified over.

We have seen, to some extent, how futures differ from futurates, but at first glance they look similar: an aspectual operator, a bouleratial modal, and a lower aspectual operator. The difference seems to be in the ordering sources used. Inertial futures are more permissive than inertial futurates, and there are subtle differences in the bouletic orderings as well.

## Chapter 4

# Futures and Futurates in Conditionals

Futurism — The Trendiest Profession

-*Newsweek* headline, March 2, 1998

In the previous two chapters, we began an investigation of the semantics of futurates, as in (177a,b), and futures, as in (177c,d):

- (177) a. Devon is leaving tomorrow.  
b. Devon leaves tomorrow.  
c. Devon is going to leave tomorrow.  
d. Devon will leave tomorrow.

Some of the data we looked at involved conditionals, but I did not go into much detail regarding interactions between the semantics of conditionals and the proposed denotations of futures and futurates. In this chapter we will examine more closely the behavior of futures and futurates in conditionals.

I argued in chapters 2 and 3 that a universal “bouletial” modal, termed  $ALL_b$ , is a component of the generic operator GEN and the progressive operator PROG. The same modal, with slightly different orderings, appears bare, as a generic version of *will*, and in *be going to*. This modal allows both bouletic and inertial ordering sources, and has a “direction presupposition” to the effect that either an animate entity (in the case of bouletic orderings) or the universe (in the case of inertial ordering) has control over what happens in the future.

I further argued that GEN and generic *will* had an aspectual element in common, ALL<sub>t</sub>, and that PROG and *be going to* had an aspectual element in common as well, SOME<sub>t</sub>, which in all cases scopes over the boulerthial modal. In all cases where there was future reference, (i.e., in futures and futurates), I claimed there was a lower operator constraining the time of the eventuality to be in the future.

In what follows, we will set aside a third reading of *will* that was discussed, dispositional *will*, which was found to be a subcase of generic *will*.

The questions that will dominate this chapter will concern how to modify these denotations in order to account for the semantics of conditionals containing futurates and futures, and in particular, effects of aspect on the set of worlds quantified over and the entailments of the conditional. We have seen some of these effects in chapter 3, in contexts of offering where bare *will* is possible, but *be going to* is not possible, as in the case of the appropriateness of (178a) on a billboard, and the inappropriateness of (178b).

- (178) a. We'll change your oil in Madera.  
       b. # We're going to change your oil in Madera.

The sentence in (178b) is rude in an offering context, I said, because it entails that the speaker believes that in some worlds in which the hearer does not want their oil changed, the speaker will change their oil anyway. I explained this effect by means of a conditional account of offering. Offering commits the offerer to the proposition in (179), where p is the proposition that the hearer wants q, but the *be going to* sentence entails the proposition in (180). It is because these are incompatible that the *be going to* sentence in (178b) cannot be used in that context.

- (179) All not-p worlds are not-q worlds  
 (180) Some not-p worlds are q worlds

In the explanation I gave for this effect, I used two crucial assumptions:

- (181) a. The highest predicate in *be going to*, which is in the consequent of the conditional, has the subinterval property (i.e., it is +SIP)  
       b. The input time of p, the time when it matters whether the hearer wants q or not, is the same as the time when the offerer is prepared to undertake q

I will not review here the mechanism that depended on these assumptions, but it can be found in chapter 3, section 3.3. It will be important to note that there is nothing about the semantics of conditionals that conflicts with *bgt*; in (182a) we see one such felicitous conditional.

- (182) a. If the clouds get heavy enough, it's going to snow.  
 b. If the clouds get heavy enough, it'll snow.

In fact, if we compare (182a) with (182b), they seem to have similar meanings.

What caused the conflict, rather, was the pragmatic requirements on felicitous acts of offering. And indeed, when we consider various other contexts in which conditionals occur, differences between *be going to* and the bare future show up that are reminiscent of the differences in offering contexts. As with the mechanism proposed in chapter 3, aspect affects which worlds are quantified over, influencing the entailments. Let's call the proposition in (180) the *SIP entailment*.

Here we will look at other conditionals, some that have the SIP entailment and some that do not; these will help us put the assumptions in (181) in a more general form, and thereby investigate the denotations and logical forms of various different kinds of conditionals with various different futures and futurates.

We will need to make some starting assumptions about the structure of conditionals. I assume, following Kratzer (1986) and many others, that they are modal in nature; that is, they involve quantification over possible worlds or situations.<sup>1</sup> Quantifiers in general I assume to have a tripartite structure, taking two propositional arguments which are referred to as the restrictor and the nuclear scope respectively (Kratzer, 1991; Barwise and Cooper, 1981).<sup>2</sup>

Our denotations are not yet up to this job. So far we have skipped the restricting propositional argument because we have not needed it; in this chapter we will add it in, though we defer the exact denotations until later because there are temporal issues that come up that need to be settled first.

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<sup>1</sup>This includes our aspectual quantifiers  $ALL_t$  and  $SOME_t$ , since, as we have said, they properly ought to be situational rather than temporal quantifiers, in order to account for the distribution of generic readings.

<sup>2</sup>It is well-known that the apparent structure of conditionals as determined by syntactic means is in conflict with the logical form needed for modals. See von Stechow (1995) among others for discussion. I will not deal with that issue here.

In a conditional, the *if*-clause is in the restriction of a modal. However, conditionals may have several, often null, modal quantifiers, so it will not typically be obvious which modal the *if*-clause restricts. To find out, we will want to know the possible temporal relations between antecedent and consequent in each conditional we examine. We can expect this kind of information, along with information about the conditions under which the aspectual effects can arise, to shed light on the logical form of these conditionals, as well as the denotations of the modals that make such a structure possible.

Let's call the modal that the *if*-clause restricts the *conditional modal*. If it is pronounced at all, the conditional modal is always in the consequent in English, but it will become clear that not every modal that appears in a consequent is the conditional modal. For the most part, we will not be investigating modals in the antecedent, though those certainly occur as well.

In section 4.1, we will see some conditional data, and get started by asking some questions about the distribution of *will*, *bgt*, and futurates in the consequents of present tense conditionals. In section 4.2, we will learn more about the conditions in which the SIP entailment occurs. We will find that the SIP value on the main verb sometimes is responsible for an SIP entailment.

In section 4.3 I ask whether the same mechanism developed in chapter 3 to explain the SIP entailment for +SIP modal  $SOME_t$  in *be going to* could be used to explain it for lower +SIP predicates. I demonstrate that the mechanism will work if certain times in the antecedent and consequent have a certain relation, and finally, elucidate what would have to be true about temporal interpretation in conditionals for that relation to hold.

Section 4.3 contains two lemmas about temporal interpretation in two different kinds of conditionals, epistemic conditionals (those in which an epistemic operator such as null EP is restricted by the *if*-clause), and boulerthial conditionals (in which a boulerthial modal such as  $ALL_b$  is restricted by the *if*-clause). It is demonstrated that these two cases involve different temporal interpretation, but that in either case, the mechanism from chapter 3 will work for lower +SIP predicates, with additional desirable consequences.

In section 4.4, formal details are presented, including a temporal relation that is of some use. The chapter concludes with section 4.6.

## 4.1 Conditional contexts

In this section we will look at conditional data. We have an idea of why the SIP entailment arises in *be going to* sentences. But now we would like to know where else it arises, and why. In this section we will look at two other contexts besides offering that allow us to detect the SIP entailment, and show how different futures and futurates behave in conditionals in those contexts.

Sections 4.1.1 and 4.1.2 look at conditionals that have futures with -SIP (eventive) main verbs. Relevance conditionals, I will show in section 4.1.1, require that all not-*p* worlds are *q*-worlds, which is compatible with the SIP entailment. +SIP futures (generic *will* and *be going to*) are, as predicted, felicitous in relevance conditionals. Unexpectedly, bare *will* is bad although there is no conflict with the relevance requirement; I propose that the source of the conflict is not a modal conflict induced by aspect, but actually an aspectual conflict with the present -SIP constraint. In section 4.1.2, I show that conditionals in indication contexts (those in which the truth of the antecedent is asserted to be an indication of the truth of the consequent) require that some not-*p* worlds are *q* worlds. Again *be going to* and generic *will* are good, as expected; again we have a question about why bare *will* is not. Indication contexts are contrasted with causal contexts, which, like offering, are demonstrated to require that all not-*p* worlds are not-*q* worlds. This raises a further question about why in causal contexts *be going to* and generic *will* are possible. This question is subsequently sharpened, in 4.1.3, where I propose that in these cases the modals are interpreted outside of the consequent. Evidence is given for this proposal, and some predictions are made about the distribution of the SIP entailment.

### 4.1.1 Relevance conditionals

Relevance conditionals are conditionals in which the antecedent seems to be a condition on the relevance to the hearer of the information in the consequent. Two examples of relevance conditionals are given in (183).

- (183) a. If you want to know, there's some beer in the fridge.  
b. If I may be frank, Frank is not looking good.

Differently from some other contexts for conditional utterances, the speaker of a relevance conditional *If p, q* cannot perfect the conditional (see von Stechow (1999) for a detailed



discussion of conditional perfection). For example, in the context of a promise, as in (184a),  $\neg p \rightarrow \neg q$  is typically implicated, as in (184b), though that implicature can be cancelled, as in (185).

(184) a. If you mow the lawn, I'll give you ten dollars.

b. If you don't mow the lawn, I won't give you ten dollars.

(185) If you mow the lawn, I'll give you ten dollars. And come to think of it, I'll give you ten dollars anyway.

Again, there is nothing about the semantics of a conditional that has anything to say about what happens in cases in which not- $p$  is true. It is the kind of speech act being made, that bears on the question of whether the not- $p$  worlds are all  $q$  worlds, all not- $q$  worlds, or some combination of  $q$  and not- $q$  worlds.

In any case, what interests us here is that relevance contexts do not allow (strong) perfection of the conditional; for example, the speaker of (183a) is not committed to (186a), nor is the speaker of (183b) committed to (186b).

(186) a. If you don't want to know, there is no beer in the fridge.

b. If I may not be frank, Frank is looking good.

Therefore, in the context in which a relevance conditional *If*  $p$ ,  $q$  is truthfully uttered, not all not- $p$  worlds are not- $q$  worlds. That is, some not- $p$  worlds are  $q$  worlds. But actually, a stronger entailment can be demonstrated; namely, that all not- $p$  worlds are  $q$  worlds. Iatridou (1994) notes that relevance conditionals are not possible with *then*:

(187) Iatridou (1994)

a. If you're interested, (*#then*) there's some beer in the fridge.

b. If I may be frank, (*#then*) Frank is not looking good.

Iatridou argues that the use of *then* in a conditional *If*  $p$ ,  $q$  presupposes that not all not- $p$  worlds are  $q$  worlds. If this is so, the impossibility of adding *then* to a relevance conditional *If*  $p$ ,  $q$  points to a requirement that all not- $p$  worlds are  $q$  worlds.

Recall that, on the proposal I am making, a *be going to* statement (normally) entails that some not- $p$  worlds are  $q$  worlds — namely those maximally consistent with the director's desires in  $w$  at  $t'$ , but before the time at which  $p$ . Thus I predict that *be going to* should be

possible in the consequent of relevance conditionals, since if all not-*p* worlds are *q* worlds, some not-*p* worlds are *q* worlds. The prediction is borne out. While the conditional in (188a), using *will*, is not a good relevance conditional (but makes a fine offer), the conditional in (188b), using *be going to*, is a good relevance conditional (and as expected, is not a good offer).

- (188) a. If you want to know, we'll go get some beer.      \*relevance (ok as an offer)  
       b. If you want to know, we're going to go get some beer.      ok relevance, \*offer

So we can explain (188b). But what about (188a)? Nothing about bare *will* should prohibit it. It's true that bare *will* has no SIP entailment, but in fact it carries no entailment whatsoever about the not-*p* worlds. So it should also be compatible with relevance contexts, in which all not-*p* worlds are supposed to be *q*-worlds, because it is silent on the subject of not-*p* worlds.

Of course some *will* clauses are good in the consequent of relevance conditionals.

- (189) a. If you really want to know, John will win.  
       b. If you really want to know, this comet will next be visible in 52 years.

I take these to be generic *will*. There could still be something about aspect (though not about its effects on the accessibility relation) that prohibits (188a) while allowing (188b) and the examples in (189); if  $ALL_b \ q$  is -SIP, for instance, as we saw in chapter 3, it might be ruled out in relevance contexts, supposing that relevance contexts have *now* input.

Let's leave this question for now and look at two other contexts for conditionals, one compatible with the SIP entailment (indication contexts), and one incompatible with it (causal conditionals). The same question about bare *will* arises: why is it impossible in contexts that are compatible with the SIP entailment? An additional question arises about +SIP futures in contexts incompatible with the SIP entailment, that will have some bearing on the logical form of these conditionals.

#### 4.1.2 Indication and causal contexts

We have just seen that relevance conditionals allow *be going to* and generic *will*, as expected, for reasons of aspectual influences on the accessibility relation. In this section we will consider conditionals that can occur in both indication and causal contexts; those in which

the antecedent can either be the cause of the consequent, or merely an indication that the consequent will occur. These results raise another question (in addition to the same one about bare *will* that was just raised).

For instance, suppose you are babysitting an infant who has an upset stomach. Her father might say one of the following in his instructions to you:

(190) If the baby cries...

- a. ...she'll spit up.
- b. ...she's going to spit up.

If the father says (190a), what he means is that her crying will cause her to spit up. He might follow up with, "So try to keep her from crying." If he instead says (190b), he could mean either that her crying will cause her to spit up, or that her crying will inform you that her stomach is upset enough that she will spit up. In the latter case, soothing her crying will not be expected to have any effect on whether she eventually spits up. It is difficult, if not impossible, to use (190a) in that context.<sup>3</sup>

The example in (191) rules out the indication context (because something you do yourself is not likely to be an indication to you of some other eventuality); thus we can see clearly that *be going to* is possible in the cause context.

(191) If you hold the baby horizontally, she's going to spit up.

Or suppose that you are going to talk to an eccentric professor who you have never met with. Another student tells you what to expect ahead of time by saying one of the following:

(192) If he hits his forehead with his hand...

- a. ...he will tell you something important.
- b. ...he's going to tell you something important.

If your fellow student says (192a), it might be rational, though perhaps not advisable, to contrive some way to make the professor hit his forehead, because in that case he will inevitably tell you something important! If your friend says (192b), however, you would probably not take that course of action; though it has that reading, the more sensible reading is possible as well.

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<sup>3</sup>Though some speakers can. I believe that they are getting the generic *will* reading. It is not clear to me, though, why other people would find it harder to get. cf. *If a baby cries, she'll spit up/If babies cry, they'll spit up.*

As we did with (191), we can verify the intuition that the causal context is possible with *be going to* by using a conditional that is only possible in a causal context. Indeed, it is felicitous.

(193) If you hit his forehead with your hand, he's going to tell you something important.

What causes the difference between *be going to* and *will* (presumably bare *will*) in indication contexts?

Remember that in the consequent of a conditional, generic *will* and *be going to* make a claim about the not-*p* worlds, by virtue of their +SIP operators, but bare *will* does not because it has none. As we did for offering and relevance contexts, let's try to determine what indication and causal contexts entail for the not-*p* worlds. Let's do causes first, because we will need them for the indication contexts.

Suppose *p* is a (compelling) cause for *q*. What can we say about the worlds in which not-*p* happens? There are two possible moves we could make here. We could say that *p* is the only cause for *q*, so that if *p* doesn't happen, *q* doesn't happen either, or we could say that *q* might have other causes, so that if *p* doesn't happen, *q* might still happen.

While it is indeed often the case that an eventuality can logically have a number of different possible causes, in a particular situation, a not-*p* world should be a not-*q* world. This state of affairs should look familiar; it is our old friend inertia worlds.

- (194) a. If you strike this match, it will light.  
b. If you hadn't struck this match, it wouldn't have lit.

(194a) does entail (194b) if the context is not changed (von Fintel, 1999).

Thus the condition on causes we want is the following.

(195) *Cause condition.* If *p* causes *q*, all not-*p* worlds are not-*q* worlds

Note that it is not compatible with the SIP entailment (that some not-*p* worlds are *q* worlds).

Now, indications. If it is the case that *p* indicates but does not cause *q*, it does not follow that if *p* had not happened, *q* would not have happened, but in this case it is rather ridiculous:

- (196) a. If the dogs run around in circles, it's going to snow.  
 b. If the dogs hadn't run around in circles, it wouldn't have snowed.

Kratzer (1989) explains this kind of fact by saying that the running around in circles proposition and the snowing proposition are not lumped together in the world in question.) In the current proposal, we might say that *p* and *q* share a common cause *c*, and that *c* is not a compelling cause of *p*, but is a compelling cause of *q*. So in a world where *c* has occurred, the universe is okay with *p*, and wants *q*. If *p* happens, we can assume that *c* has happened (supposing that the cause condition in (195) applies to non-compelling causes as well as compelling causes). Therefore, since *c* is a compelling cause for *q*, *q* will happen. However, if *p* does not happen, that is not evidence that *c* did not happen (hence that *q* will not happen). So:

- (197) *Indication condition.* If *p* is an indication of *q*, some not-*p* worlds are *q*-worlds

Unlike the cause condition, the indication condition is compatible with the SIP entailment (in fact, it is the SIP entailment). Thus we predict that the +SIP futures should be possible in indication contexts but not in cause contexts, and that bare *will* should have the opposite judgments.

The prediction that *be going to* should be possible in indication contexts is borne out, as is the prediction that bare *will* should be possible in causal contexts.<sup>4</sup> But as in relevance conditionals, although bare *will* is predicted to be possible in indication contexts, because it says nothing about not-*p* worlds, it is not possible. And unexpectedly, *be going to* appears to be possible in causal contexts. Why is it possible to say *If the baby cries, she's going to spit up* in the context in which her crying actually causes her to spit up? The same is true of generic *will* in (198). (That it is generic *will*, not bare *will*, is shown by the fact that the generic reading of the indefinite is possible:

- (198) If you hold a baby horizontally, she'll spit up.

If *be going to* and generic *will* really entail that there are some not-*p* worlds that are *q* worlds, we are at a loss to explain why they can appear when apparently there are no not-*p* worlds that are *q* worlds.

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<sup>4</sup>I also predict that generic *will* should be possible in indication contexts, and I don't know why more speakers do not find it acceptable.

### 4.1.3 Wide scope *gen-will* and *be going to*

So why are the bare *will* sentences we have seen unexpectedly unacceptable in relevance and indication contexts? And why are the +SIP futures, generic *will* and the progressive future *be going to*, unexpectedly acceptable in causal contexts? Continuing to leave aside the first question for now, let's articulate the second question, which will then put us in a position to further investigate the first.

We saw above that generic *will* and *be going to* can be used in such a way as to avoid violating the cause condition. This was unexpected. The cause condition, we said, has a requirement that is similar to one in the offering condition – namely, that all not-*p* worlds are not-*q* worlds — that conflicted with the SIP entailment.

If the +SIP futures can avoid violating the cause condition, they should also be able to violate the offering condition. In the absence of a good test to distinguish bare *will* and generic *will*, we will not be able to learn much about generic *will* from the fact that *will* sentences are good as offers. But *be going to* is another story. It turns out we can, after all, use *be going to* as an offer if we choose the context carefully:

(199) *Be going to* used to make an offer:

We're going to take good care of you before your defense. If you want a manicure, we're going to give you a manicure. If you want an oil change, we're going to change your oil.

These conditionals do present the manicure and the oil change as contingent on the hearers desires. What is not negotiable is the idea that the speaker is going to take care of the hearer.

Many speakers I have consulted with have an intuition that in this example, as well as in the cause context, *be going to* is taking wide scope over the entire conditional. In the offering, what's going to happen is this: you want a manicure, we give you a manicure. In the cause context, what's going to happen is this: you hold the baby horizontally, she spits up. Thus *be going to* has two readings: this wide scope reading, and the narrow scope reading.

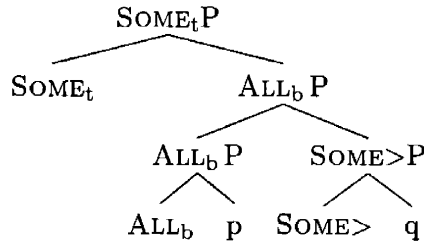
The narrow scope reading is the one that I showed triggered the SIP entailment in chapter 3, and gave the explanation for that effect. But there we did not attempt to give an account of the semantics of an entire offering conditional; we only considered *p* worlds,

without saying which quantifier quantified over the  $p$  worlds. In any case, though, the conditional modal wasn't the  $ALL_b$  in *be going to*, since that had to be under  $SOME_t$  the +SIP element.  $SOME_t$  in turn had to be interpreted in the consequent in order to get the mechanism to work. The conditional modal, then, was not the  $ALL_b$  in *be going to*, but was some higher null modal.

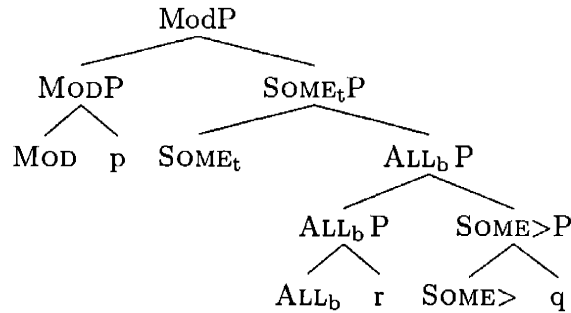
In the wide scope reading, however, the SIP entailment is absent. The intuition that *be going to* (and thus  $ALL_b$ ) somehow scopes over the antecedent as well as the consequent amounts to an intuition that  $SOME_t$  and  $ALL_b$  are interpreted outside of the consequent, seemingly with  $ALL_b$  as the conditional modal (and  $SOME_t$  higher than it, as usual). Thus we do not expect to get the SIP effects, since in these cases at least, there is no +SIP predicate left in the consequent. With the aspectual semantics removed from the conditional, the sentence no longer makes any claim about not- $p$  worlds. Therefore, there is no conflict with the cause condition or the offering condition.

These are the structures I am proposing:

(200) Wide *be going to* conditional



(201) Narrow *be going to* conditional



For evidence that this is the right way to think about these facts, we turn first to Turkish. Turkish has a morpheme traditionally called the Future, which, I proposed in chapter 3, is a progressive future. By itself, the Future can only get a cause context (i.e., no SIP entailment), not an indication context. However, with an additional, higher epistemic modal, the indication context is perfectly acceptable:

- (202) a. Bebek ağla-r-sa, kus-acak.  
 Baby cry-aor-cond, throw.up-fut.  
 'If the baby cries, she's going to throw up.'  $\sqrt{\text{cause}}$ , \*indication
- b. Bebek ağla-r-sa, kus-acak-tir.  
 Baby cry-aor-cond, throw.up-fut-modal  
 'If the baby cries, she's going to throw up.' \*cause,  $\sqrt{\text{indication}}$

I am proposing something similar for English, except that in English, the conditional modal used in indication contexts is not pronounced, while in Turkish it is.

English provides another source of evidence that there is a wide scope reading of *be going to* as well as a narrow scope reading; the data has to do with *already*.

*Already* requires a +SIP complement (cite). Thus if it is in a position to take  $\text{SOME}_t$  as its complement it will be happy. But if  $\text{SOME}_t$  is interpreted higher, and there is nothing +SIP under *already*, it should be unhappy. Thus with *already* in the right position, we expect the indication reading of (203a) to be possible, but the cause reading to be impossible, because the cause reading is the wide scope *be going to*. This seems to be so. The judgment is confirmed by the infelicity of (203b), which rules out the indication reading anyway, so with *already*, no reading is available at all.<sup>5</sup>

- (203) a. If the baby cries, she's already going to spit up. indication, #cause  
 b. # If you hold the baby horizontally, she's already going to spit up.

So there is some initial support for an analysis of *be going to* conditionals as having two readings: one in which *be going to* takes narrow scope over just the consequent, and one in which it takes wide scope over the entire conditional.

So far: we have noted that relevance and indication contexts permit conditionals with progressive and generic futures (*be going to* and generic *will*) in English. This is expected according to the mechanism developed in chapter 3, because these futures trigger SIP entailments, which are compatible with relevance and indication contexts. However, we also saw causal and offering cases in which progressive and generic futures are possible in contexts that are incompatible with the SIP entailment. I suggested that in these cases the +SIP component ( $\text{SOME}_t$  or  $\text{ALL}_t$ ) is interpreted outside the consequent and provided evidence that this is so.

<sup>5</sup>It would be nice if we could use *already* to test for generic vs. bare *will* in a similar way, but it seems to be unable to be high enough; it seems to require the main verb to be +SIP.



In the next section we will evaluate a prediction raised by this section. The prediction is as follows. If, as I have argued, in wide scope +SIP future conditionals, the +SIP element of the future (either  $ALL_t$  or  $SOME_t$ ) is not interpreted in the consequent, and if the SIP entailment is triggered by +SIP consequents, a +SIP main verb in the consequent of such a conditional should trigger the SIP entailment after all. We will see that it does.

We will also have more to say about bare *will*. Recall that it was unexpectedly bad in contexts compatible with the SIP entailment; this was unexpected because bare *will* apparently has no entailments that would be incompatible with such contexts. I suggested that something strictly aspectual was going on, as opposed to aspectual effects on the accessibility relation; in section 4.2 we will see evidence that this is indeed the case.

## 4.2 Pinning down the SIP entailment

In section 4.2.1, we investigate the effects of the SIP value of main verbs on SIP entailments. As predicted, wide scope *be going to* and wide scope generic *will* show SIP entailments with +SIP *vPs* (though as demonstrated above, they show none with -SIP *vPs*). We also take up the issue of the distribution and structure of bare *will*. Section 4.2.2 shows how the mechanism from chapter 3 can also account for SIP entailments with +SIP complements. Section 4.2.3 deals with pasts, generics, and progressives, and raises some other questions. Thus we will have a sketch of what has to be true in order for us to be able to explain these facts, and an outline of the strategy for the remainder of the chapter to show that these things are in fact true.

### 4.2.1 Main verbs and the SIP entailment

In this section we will see that wide scope +SIP futures show main verb SIP effects and narrow scope +SIP futures do not, as predicted. Bare *will* shows main verb SIP entailments as well, which allows us to answer our question about it above.

Before we do so, I want to define a certain temporal relation that will be useful.

#### 4.2.1.1 The box relation

In a number of different environments, a morphologically present tense stative or progressive can have a run time either overlapping *now* or entirely in the future, and morphologically

present tense eventives can only be in the future.<sup>6</sup>

- (204) a. If Dale is here at the moment, ...  
 b. If Dale is here tomorrow, ...  
 c. \*If Sandy leaves at the moment, ...  
 d. If Sandy leaves tomorrow, ...
- (205) a. Dale must be here at the moment.  
 b. Dale must be here tomorrow.  
 c. \*Sandy must leave at the moment.  
 d. Sandy must leave tomorrow.
- (206) a. For Dale to be here at the moment is surprising.  
 b. For Dale to be here tomorrow would be surprising.  
 c. \*For Sandy to leave at the moment is surprising.  
 d. For Sandy to leave tomorrow would be surprising.

Then these examples share an inability of non-statives to happen *now*, and an ability of statives to happen either *now* or in the future. The inability of non-statives to overlap *now* is due to the present -SIP constraint.<sup>7</sup>

- (207) present -SIP constraint  
 for all -SIP,  $w$ :  
 $p(w)(now)$  is undefined

Since lexical statives seem able to take future input times, perhaps we should define our new relation as follows:

- (208) “ $Qt' \triangleright t: [p(w)(t)]$ ” is an abbreviation for “ $Qt' > t: [p(w)(t')]$ ” if  $p$  is -SIP, and  
 “ $Qt'$  includes or is later than  $t[p(w)(t')]$ ” if  $p$  is +SIP.

<sup>6</sup>We leave aside here sports broadcasts, screenplays, and the like.

<sup>7</sup>Condoravdi (2001) has a function which is similar to but not entirely like this relation (“o” denotes temporal overlap).

$AT(t, w, P) = \exists e [P(w)(e) \ \& \ \tau(e, w) \subseteq t]$  if  $P$  is eventive

$\exists e [P(w)(e) \ \& \ \tau(e, w) \circ t]$  if  $P$  is stative

$P(w)(t)$  if  $P$  is temporal

But there are reasons to think otherwise. Recall that the version of the subinterval property we are using is, as in Dowty’s original conception of it, a property of predicates of times. More recently, it has largely been treated as a property of predicates of events.<sup>8</sup> We have, though, a compelling reason to use times rather than events. While event arguments are thought to be confined to the *vP*, the subinterval property, I have been arguing, affects modal  $\text{ALL}_b$  exactly as we would expect it to if it were a temporal property.

If the subinterval property, then, is a property of predicates of times, there seems no reason why it should not hold of predicates of times that do not have event arguments, such as *PAST*, for instance.

Recall that *PAST* is a predicate that can occur with a *now* input. In fact, it must have a *now* input; if it didn’t, and could take a future input instead, we might expect that the eventuality (209) could have a run time in the future with respect to *now*, but in the past with respect to the future input.

(209) John left.

Obviously this is not the way *PAST* works. Matrix *PAST* has to take a present input, and is not allowed to take a future input.<sup>9</sup>

One way to get out of this difficulty is to assume that the box relation says that +SIP must include ( $\supset$ ) and -SIP must follow ( $>$ ) the input time, but further suppose that future-oriented lexical statives have to have some sort of inchoative or completive operator on top of them to make them -SIP. Is this move independently motivated in any way?

Many people have talked about “bounded” and “unbounded” statives. (cite, describe) We need lexical statives to be ambiguous, so that the box relation has no optionality (since we have some +SIP elements for which  $>$  is apparently not an option). In a way this is like perfective versus imperfective statives in other languages, which raises the question whether the subinterval property is really what is going on here (a question I will not be asking in a serious fashion here). The significance of this assumption to the present discussion is that apparently, while it is possible to have an inchoative/completive reading with “derived statives” — progressives and generics — it is much easier to do so with lexical statives, though I have no explanation for this fact. Here I will demonstrate one environment in

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<sup>8</sup>Or situations, which would work here as well.

<sup>9</sup>This was why Condoravdi defines her “temporal” case in terms of overlap; but the point here is that temporal predicates are not a special case.

which this is so. In the next section, we will then use this fact in our explanation for the distribution of SIP entailments.

One place we can see this kind of pattern is in the ability to have U(niversal)-perfect and E(xperiential)-perfect readings (Iatridou et al., 2001). Eventives get no U-perfect reading but do get an E-perfect reading.<sup>10</sup>

(210) (John has stuck his tongue out.)

- a. \* U-perfect: there is a time span which starts in the past and includes the present and during the entirety of which is an event of John sticking his tongue out.
- b. E-perfect: John has had the experience of sticking his tongue out.

Lexical statives get the U-perfect reading, but also, relatively easily, get an E-perfect reading:

(211) John has been in Paris.

- a. *U-perfect*: There is a time span which starts in the past and includes the present and during the entirety of which John has been in Paris.
- b. *E-perfect*: In the past John has had the experience of being in Paris.

With generics and progressives, however, while it is easy to get a U-perfect reading, it is not so easy to get an E-perfect reading. For example, the only reading of (212) easily available is the U-perfect reading, in which Genevieve's habitual winning is asserted to span over an interval that starts sometime in the past and extends up to the present.

(212) Genevieve has always won.

However, with some serious contextual gymnastics, it is possible to get an E-perfect reading out of a perfect generic. Suppose that every summer Genevieve gets together with her family from a different city to go on vacation for a week. They always spend the evenings during this week playing hearts, and Genevieve usually wins. Suppose too that this year Genevieve did quite well even for herself, and won every game. In that context, the perfect generics in (213) can have an E-reading: what is being discussed is whether Genevieve has ever had the experience of always winning before.

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<sup>10</sup>There is also a perfect of result reading, in which his tongue is necessarily still out, but we won't worry about that here.

- (213) a. Wow, a new record: Genevieve has never always won before!  
 b. No, Genevieve has always won before. Two out of the last ten vacations, she won every game.

Likewise, a perfect progressive will generally get only a U-perfect reading, as demonstrated in (214).

- (214) John has been working on his thesis.  
 a. *U-perfect*: There is a time span which starts in the past and includes the present and during the entirety of which John has been working on his thesis.  
 b. *# E-perfect*: In the past John has had the experience of working on his thesis.

Yet if the context is correct (and adding *before* helps too), an E-perfect reading is possible here as well; (215) conveys that Don has had the experience of working on Christmas Eve before:

- (215) Don has been working on Christmas Eve before.

I don't have much to say about exactly how this trait is related to the +SIP/-SIP phenomenon, except that the U-perfect reading seems to be only possible with +SIP predicates.

The upshot of this digression: perfects with lexical statives can easily have either U-perfect or E-perfect readings. Perfect generics and perfect progressives usually get a U-perfect reading, but can be coerced into an E-perfect reading. The primary point I want to draw from these facts, even if it is more of an analogy than anything else, is that lexical statives are easier to coerce into behaving as if they are (perhaps) -SIP than are progressives and generics; this in turn means that the suggestion that future statives have been coerced into being -SIP by a higher -SIP operator is perfectly plausible. So the definition for the box relation that we want is the following:

- (216) “ $Qt' \triangleright t: [p(w)(t)]$ ” is an abbreviation for “ $Qt' > t: [p(w)(t')]$ ” if  $p$  is -SIP, and “ $Qt'$  including or later than  $t[p(w)(t')]$ ” if  $p$  is +SIP.

This pattern will be evident in the data we are about to look at, as we try to find correlations between the SIP value of material *under* the future, and occurrence of the SIP entailment.<sup>11</sup>

<sup>11</sup>Where does the box relation come from? Cf. discourse effects: In *John came in. Mary was there.* the stative run time must include eventive run time; in *John came in. Mary left,* Mary's leaving must follow

#### 4.2.1.2 SIP entailments correlating with main verb SIP value

To take stock of where we are, recall that we had a prediction about wide scope readings of +SIP futures. We saw that with eventive main verbs they lack the SIP entailment. This was attributed to the +SIP element in the denotation of the future being interpreted not in the consequent, but outside it. The prediction was then made that wide +SIP futures should regain the SIP entailment when there was still something +SIP left in the consequent. We saw that it is sometimes tricky to decide whether something is +SIP, but that it is easier with the so-called “derived statives” than it is with lexical statives (and temporal properties like PAST are easiest of all).

We also had a question about bare *will*. The question was why the bare *will* sentences we saw, which had eventive main verbs, were not acceptable in contexts compatible with SIP entailments.

Here are the generalizations ahead of time: bare *will*, wide *be going to*, and wide generic *will* all show SIP entailments when the highest predicate interpreted in the consequent is +SIP, making the entire consequent +SIP. Narrow scope *be going to* and narrow scope generic *will* do not show any difference between +SIP and -SIP verb phrases. This confirms our prediction about the wide scope +SIP futures. In general, we expect the SIP value of a predicate in the consequent to matter when there is nothing higher than it with a +SIP value interpreted in the consequent. And in particular, we expect the +SIP value of the complement of a future (that is, the *vP* in the consequent) to matter only when the future is either transparent to the SIP effect, or is interpreted outside the consequent. The pattern where the complement matters I will call the *complement SIP effect*.

Furthermore, I will argue that if  $ALL_b$  is neither +SIP nor -SIP but in a sense transparent, we can explain why bare *will* with -SIP predicates are not possible with present input but bare *will* with +SIP verbs are; it is just the present -SIP constraint. (However, we will not be able to tell whether  $ALL_b$  is interpreted in the consequent or not.)

Now let’s look at the data, because there is a lot of it. We will be trying out different futures in the different contexts, with different SIP values for the complements of the futures. The organization will be into contexts first (offering, relevance, indication/causal), and within those, each future (bare *will*, and wide and narrow *be going to*) will be tested

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John’s coming in.

with eventive, lexical stative, and progressive complements. We could have used generic complements as well here, but their lack of morphology makes them difficult enough to distinguish from eventives that I judged it not worth the trouble. Also, we will skip wide and narrow generic *will* because I do not have a good test to distinguish one from the other. Throughout, the reader will observe that the eventive complements, which are -SIP, behave one way; the progressive complements, which are +SIP, behave in the opposite way; and lexical statives can behave in either way. This permissive behavior of lexical statives is due, I believe, to the ability to be either +SIP or, with the help of an embedding -SIP predicate, -SIP, as discussed in the previous section. Thus the reader may feel free to ignore the lexical statives; the real action will be in whether there is a contrast between eventives and progressives.

Without any further ado, let's dive in.

*Offering contexts.*

$\checkmark \Rightarrow$  no SIP entailment,  $\# \Rightarrow$  SIP entailment

While bare *will* + eventive and bare *will* + stative can be used in offering contexts, bare *will* + progressive is degraded.

(217) Offering: bare *will* has complement SIP effect

- a. If you like, I'll give you a call at 4.
- b. If you like, I'll be on the phone at 4.
- c. ?? If you like, I'll be talking to you on the phone at 4.

Note that we can perfectly well express an offer to be doing something at a particular time by using *can*:<sup>12</sup>

(218) If you like, I can be talking to you on the phone at 4.

Thus there is nothing anomalous about offering to carry out something that is ongoing at a particular time, it is just that (217c) is not a way to express it.

Recall that wide *be going to* with eventive complement was good with offers. Compare (219a) (as above in chapter 3) with (219b,c). Progressives are bad, The fact that *already* is infelicitous confirms that we are dealing with wide *be going to*, not narrow *be going to*.

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<sup>12</sup>I suspect that the consequent here is actually an embedded relevance conditional.

(219) Offering: wide *be going to* has complement SIP effect

- a. We're going to take good care of you the week before you defend. If you want an oil change, we're going to change your oil. If you want a manicure, we're (#already) going to give you a manicure.
- b. We are going to take good care of you the week before you defend. If you want us to be enforcers to make sure you get everything done, we're going to be enforcers. If you want us to be enablers to make sure you get enough chocolate to eat, we're (#already) going to be enablers.
- c. We are going to take good care of you after your defense. We plan to start the preparations the minute you go into your defense. At the moment when your committee says, "Congratulations," we will already be in action. #If you want us to decorate your office, we are going to be decorating your office. #If you want us to call everyone you know to invite them, we are going to be calling everyone you know to invite them.

Thus wide scope *be going to* offers can be made only with *be going to* + eventives and *be going to* + statives, not with *be going to* + progressives; again this is the complement SIP effect.<sup>13</sup>

In narrow *be going to*, on the other hand, it does not matter whether the verb is non-stative, stative, or progressive. It is still odd to use *be going to* as an offer.

(220) Offering: narrow *be going to* has no complement SIP effect

- a. # If you like, I'm already going to give you a call at 4.
- b. # If you like, I'm already going to be on the phone at 4.
- c. # If you like, I'm already going to be talking to you on the phone at 4.

*Relevance contexts.*

✓ ⇒ SIP entailment, # ⇒ no SIP entailment

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<sup>13</sup>The fact that wide *be going to* + eventive offering improves with an past or pluperfect antecedent is because past and past perfect are +SIP.

We are going to take good care of you after your defense. We plan to start the preparations the minute you go into your defense. At the moment when your committee says, "Congratulations," we will already be in action. ✓If you had told us to decorate your office, we are going to be decorating your office. ✓If you had told us to call everyone you know to invite them, we are going to be calling everyone you know to invite them.



In relevance conditionals, bare *will* + stative and bare *will* + progressive both get SIP entailments, making them good:

(221) Relevance: bare *will* has complement SIP effect

- a. ?? If you want to know, I'll give you a call at 4.
- b. If you want to know, I'll be back at 4.
- c. If you want to know, I'll be talking on the phone at 4.

We can't test wide *be going to* for relevance because we don't have the right tests; we can only tell if the wide reading is present if the narrow reading is absent, and in relevance contexts, the narrow reading is present.

(222) Relevance: narrow *be going to* has no complement SIP effect

- a. If you want to come along, I'm already going to go there at 4.
- b. If you want to come along, I'm already going to be there at 4.
- c. If you want to come along, I'm already going to be drinking at 4.

*Indication contexts.*

$\checkmark \Rightarrow$  SIP entailment,  $\# \Rightarrow$  no SIP entailment

*Causal contexts.*

$\checkmark \Rightarrow$  no SIP entailment,  $\# \Rightarrow$  SIP entailment

(223) Indication/cause: bare *will* has complement SIP effect

- a. If the dogs run around in circles, it will snow. ( $\#$ indication,  $\checkmark$ cause)
  - b. If the dogs run around in circles, it will be cold. ( $\checkmark$ indication,  $\checkmark$ cause)
- If the dogs run around in circles, it will be snowing.  
( $\checkmark$ indication,  $\#$ cause)

(224) Indication/cause: narrow *be going to* has no complement SIP effect

- a. If the dogs run around in circles, it's already going to snow. ( $\checkmark$ indication,  $\#$ cause)
- b. If the dogs run around in circles, it will already be cold. ( $\checkmark$ indication,  $\#$ cause)

- c. If the dogs run around in circles, it will be snowing.

( $\sqrt{\text{indication}}$ , #cause)

We can test wide *be going to* in causal contexts for the complement SIP effect, since narrow *be going to* does not occur. As predicted, +SIP complements (here, the progressive, but presumably also one reading of the stative) do not permit the causal reading.

(225) Cause: wide *be going to* has complement SIP effect

- a. If you hold the baby horizontally, she's (#already) going to spit up.
- b. If you hold the baby horizontally, she's (#already) going to be a mad little baby.
- c. # If you hold the baby horizontally, she's (#already) going to be crying.

Our prediction with respect to wide scope +SIP futures is borne out, at least for *be going to*, the only +SIP future that we could test. Wide scope +SIP futures show the complement SIP effect, getting SIP entailments when their complement is +SIP. That shows that we are on the right track. In the next section we will outline how the mechanism proposed in chapter 3 for SIP entailments for a higher SIP predicate ( $\text{SOME}_t$ ) could be made to work for these complement SIP cases.

Bare *will* (which is just  $\text{ALL}_b$ ) also shows SIP entailments with +SIP complements. There are two possibilities for why this might be so.

The first is that  $\text{ALL}_b$  is interpreted in the consequent (and some higher null modal is the conditional modal), but it does not interfere with the proposed mechanism's sensitivity to the complement's SIP value. Such a structure is in (226):

(226)  $[\text{mod } p \text{ } [[\text{will } r] \text{ } q]]$

In other words,  $\text{ALL}_b$  is not itself -SIP, and we know it isn't +SIP either, because if it were, it would trigger SIP entailments by itself, and it does not. If  $\text{ALL}_b$  is transparent with respect to SIP requirements (that is, it can be predicated of *now* but does not have the subinterval property), then we would expect the SIP value of the main verb to be relevant.

The second possibility is that  $\text{ALL}_b$  is interpreted outside the consequent, perhaps as the conditional modal. This case is entirely parallel to the wide scope *be going to* and wide scope generic *will* cases.

But even in this case, it turns out that  $ALL_b$  should be transparent; bare *will* + stative yields something that can be predicated of the present. Recall the examples from chapter 3. The idiomatic reading of *I can't believe (that)* required that the complement be +SIP, because there was a presupposition of the truth of the complement at the speech time, and because of the present perfective constraint, it had to be +SIP. For example, the *be going to* complement is +SIP by virtue of  $SOME_t$ , so it is fine on the idiomatic reading in (227a). But the bare *will* + eventive complement in (227b) only gets the non-idiomatic reading, in which the speaker is actually expressing doubt about the marriage plans of the addressee.

- (227) a. I can't believe you're going to get married!  
 b. #I can't believe you'll get married!

However, in bare *will*<sup>14</sup> + stative, the idiomatic reading is in fact possible.

- (228) I can't believe you'll be married in a month!

This means that as far as the present perfective constraint is concerned, the bare *will* + stative clause is +SIP. If bare *will* —  $ALL_b$  — were -SIP, (228) would not be possible on the idiomatic reading. But because bare *will* + eventive is not good, as in (227), that means  $ALL_b$  cannot be +SIP.

We will have to revise what we said about unrestricted, unembedded *will* necessarily being generic; with a stative, bare *will* apparently need not be restricted or embedded.

- (229) Revised rule of thumb: an unembedded, unrestricted *will* + eventive is generic *will*

It is still not clear, however, why restricting bare *will* + eventive would help it escape a violation of the present -SIP constraint.

In this section, we have seen the complement SIP effect in wide scope *be going to*, as predicted. We have also seen it in bare *will*, which is compatible with two conclusions: either it is interpreted in the consequent and does not interfere with the mechanism from chapter 3, or it is interpreted outside the consequent. In either case it has to be transparent to SIP principles.

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<sup>14</sup>At least, we have no real reason to think this is generic *will*.

Now that we have some idea of where SIP entailments occur, the next question to ask is how it all works. What do instances of the SIP entailment using different SIP elements have in common? I have been assuming that complement SIP has similar effects as  $SOME_t$  because the same mechanism is involved in both; the one that was developed in chapter 3 to account for the impossibility of (narrow) *be going to* ( $= SOME_t + ALL_b$ ) in offering contexts. In section 4.2.2, we determine whether the same mechanism could be made to work for the complement SIP effect.

## 4.2.2 Implementing the mechanism

So, can we get the same mechanism we argued for for  $SOME_t$  in *be going to* to also explain the complement SIP effect? That is, can we explain (for example) the infelicity of (230b) by way of the same mechanism we used to explain the infelicity of (230a)?

- (230) a. # We're going to change your oil in Madera.  
 b. # We'll be changing your oil in Madera.

In this section, I will argue that we can, provided that the input time of the +SIP element in the consequent is the same time as the antecedent TP input time.

We will re-examine the mechanism we developed in chapter 3 to see how it might be used to explain the facts we have just discussed. Then we will see how this accounts for the SIP entailments of other SIP predicates in the consequent. Later, in section 4.3, we will examine the temporal semantics of conditionals to see if they will permit the temporal relation between the antecedent and the consequent to be what we need to make the mechanism work.

Let's remind ourselves what the mechanism was for explaining the SIP entailment of narrow *be going to*.

Recall that *be going to* is analyzed as having an aspectual modal  $SOME_t$  taking scope over a boulerthial modal  $ALL_b$ .

- (231)  $SOME_t(ALL_b(d))(SOME_{>}(q))(w)(t) = 1$  iff  $\exists t'$  that includes  $t: [\forall w'$  metaphysically accessible from  $w$  at  $t$  and maximally consistent with  $d$ 's desires in  $w$  at  $t: [\exists t'' > t': [q(w')(t'')]]$   
 Presupposed:  $d$  directs  $q$  in  $w$  at  $t'$

A conditional with *be going to* in the consequent of a conditional says that all worlds where  $p$  is true at  $t$  are worlds where  $\text{ALL}_b(d)(q)(w)(t')$  is true, where  $t'$  is some interval properly overlapping  $t$ . Then  $q$  is true not only on the  $p$  worlds (those that  $d$  wants at  $t$ ), but on some worlds that are what  $d$  wants before  $t$ , among which there are (typically) some not- $p$  worlds; since  $d$  is presupposed to be able to determine, throughout interval  $t'$ , whether  $q$  happens, if  $d$  wants  $q$ , it is presupposed that  $q$  will happen. This explained why in offering contexts, for instance, which have a condition that all not- $p$  worlds are not- $q$  worlds, a conditional with (narrow) *be going to* is infelicitous.

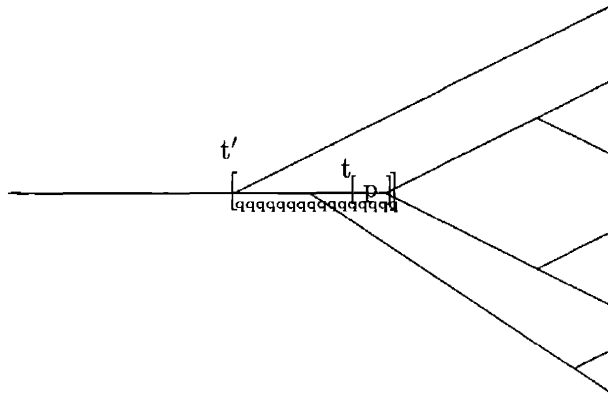
One crucial piece of this account was the argument that in present tense conditionals in offering contexts, the time of the hearer's wanting  $q$  was the same time at which the director  $d$  was prepared to want  $q$  on the hearer's behalf and carry it out. However, we did not undertake an analysis of the entire semantics of the *be going to* conditional to understand more generally which times are involved, and how the semantics of the conditional contribute the temporal relations. Having seen that the modals in consequent futures and futurates can be interpreted either as the conditional modal or embedded in the consequent, it is good that we did not attempt such an analysis earlier. But now it is time to do so.

I assume that the time in the antecedent that matters is the TP input, and that the time in the consequent that matters is the input to a +SIP element.

- (232) *SIP entailment condition.* A conditional will trigger an SIP entailment if and only if the consequent has a +SIP predicate whose input is the same as the antecedent's TP input

Suppose now that the consequent has a lexical stative  $q$  whose input is the same time as the antecedent TP input. We might represent that state of affairs as below.

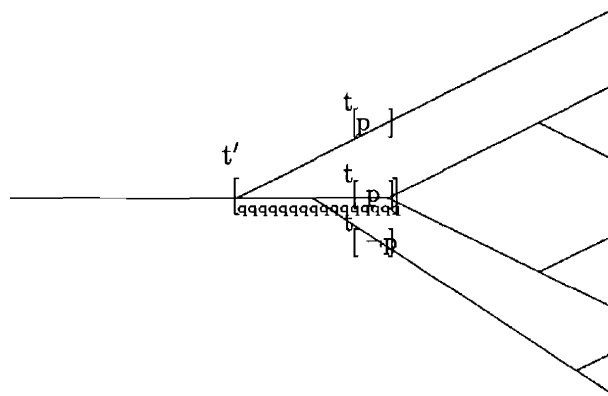
(233)



Recall that the higher conditional modal, whether it is  $ALL_b$  or  $EP$ , or  $REL$ , requires that all  $p$  worlds are  $q$  worlds. Offering requires that all not- $p$  worlds are not- $q$  worlds. We want the conditional with (e.g.) a +SIP  $q$  to be infelicitous as an offer on the wide scope reading.

The predicate  $q$  is +SIP; it has the subinterval property. Thus any subinterval of the interval over which  $q$  holds also counts as an instance of  $q$ . Consider a world that branches off from the  $p$ -world before  $p$  but during the run time of  $q$ . This is a world maximally consistent with the desires of  $d$ , the director, at the time of branching. This world is a  $q$  world, because it contains a little bit of  $q$ , and containing a little bit of  $q$  is enough to make it a  $q$  world, by the subinterval property. This world also could be a not- $p$  world, because it branches off before  $t$ . (We can generally assume there is such a world in an offering context.)

(234)



Thus the SIP entailment goes through, as desired, explaining why the conditional in question is not felicitous in offering contexts.<sup>15</sup>

Consider now what would happen if *q* is instead non-stative. If we can show that *q* must happen after *p* — if for instance a box relation was involved whose input is connected to the TP time of the antecedent — that would account for the lack of *be going to*-like judgments in these cases. (A box relation would not make any difference to what we have said so far about statives, since in that case the relation is  $\supset$ .)

On our way to determining whether and how the mechanism can actually work in all our conditionals, let's round out our study of SIP entailments in conditionals by examining some other +SIP predicates in conditionals without futures: past tense, and futurates.

### 4.2.3 Other operators and SIP entailments

PAST, PROG, and GEN are also +SIP predicates. The justification for this designation is that they can all occur with present input. We expect them to behave like +SIP futures in the consequent of conditionals. They should trigger the SIP entailment if interpreted in the consequent, but if they are interpreted outside the consequent, the presence or absence of the SIP entailment should depend on the SIP value of the complement.

#### 4.2.3.1 PAST

PAST turns out to behave as if it is in the consequent, triggering the SIP entailment regardless of the SIP value of the main verb. Like narrow *be going to*, it is bad in offering contexts.

(235) Offering: PAST has no complement SIP effect

- a. # If you want us to change your oil in Madera, we changed your oil in Madera.
- b. # If you want us to change your oil in Madera, we were here.
- c. # If you want us to change your oil in Madera, we were changing your oil in Madera.

Thus PAST must be interpreted inside the consequent.

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<sup>15</sup>It does seem that *q* is asserted to happen before not-*p* (or *p*) on these desire-worlds. But with an assumption of denseness of the timeline you could get arbitrarily close to the time at which *p*, which might let us say that *q* overlaps *p* at that time.

In relevance contexts, PAST consequents are good with any complement whatsoever. Again this is consistent with it being +SIP and interpreted in the consequent.

(236) Relevance: PAST has no complement SIP effect

- a. If you really want to know, Joe left.
- b. If you really want to know, Joe was here.
- c. If you really want to know, Joe was eating a pear.

PAST in indication contexts points to the same conclusion, since like narrow *be going to*, it is good no matter what the SIP value of the verb is.<sup>16</sup>

(237) Indication: PAST has no complement SIP effect

- a. If Barbara is here, she got the letter.
- b. If Barbara is here, she was here yesterday too.
- c. If Barbara is here, she was talking to her brother yesterday.

Finally, cause contexts are not permitted:

(238) Cause: PAST has no complement SIP effect

- a. # If you hold the baby horizontally, she spat up.
- b. # If you hold the baby horizontally, she was happy.
- c. # If you hold the baby horizontally, she was laughing.

This is again as expected if the past tense is +SIP and obligatorily interpreted in the consequent in these conditionals.

#### 4.2.3.2 PROG and GEN

PROG and GEN are not so well-behaved as PAST. We have already been considering PROG part of the complement while testing higher predicates for SIP value; now we will test PROG in the same way, along with GEN.<sup>17</sup> PROG and *Gen*, in fact, both display the complement SIP effect.

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<sup>16</sup>I have changed the antecedent to be +SIP. A -SIP verb is not possible:  $\sqrt{\text{If Barbara comes, she got the letter}}$ . This restriction has to do with the conditional modal, which is epistemic and is discussed later in section 4.3.

<sup>17</sup>Recall that PROG and GEN have both futurate and non-futurate readings. The differences between futurates and non-futurates will not concern us much here, except in the temporal location of lexical statives. To ensure that we have a real +SIP predicate in a lexical stative, it is important for it to have a present



(239) Offering: progressive has complement SIP effect

- a. If you want us to change your oil in Madera, we're changing your oil in Madera.
- b. # If you want us to change your oil in Madera, we're being helpful (now).

(240) Offering: generic has complement SIP effect

- a. If you want us to change your oil in Madera, we change your oil in Madera.
- b. If you want us to change your oil in Madera, we are always helpful these days.  
#offer (good relevance)

Given that PROG and GEN are themselves +SIP, this pattern requires that on at least one reading of these; that is, the +SIP component of these (SOME<sub>t</sub> and ALL<sub>t</sub> respectively) is interpreted outside of the consequent.<sup>18</sup>

The facts that *already* is not possible with wide scope readings, and is not possible in (241), confirms our finding that these are wide scope readings.

- (241)
- a. If you want us to change your oil in Madera, we're (#already) changing your oil in Madera.
  - b. If you want us to change your oil in Madera, we (#already) change your oil in Madera.

In cause contexts, as we would expect, the complement SIP effect also kicks in. (These are the kind of conditionals that we saw much earlier, in chapter 2, as part of an argument that futurates were modal.)

(242) Cause: progressive has complement SIP effect

- a. If it rains tomorrow, Joe is leaving.
- b. # If it rains tomorrow, Joe is being annoying (now).

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input, since the -SIP version is ruled out in this way. Cross-cutting the futurate/non-futurate distinction is the bouletic/inertial distinction; towards the end of this section we will discuss restrictions on inertial readings.

<sup>18</sup>If the input is instead in the future (meaning the > part of the  $\oslash$  relation is used), the -SIP reading is the only reading, and the offer is good:  $\sqrt{\text{If you want us to change your oil in Madera, we're being your mechanics tomorrow.}}$

(243) Cause: generic has complement SIP effect

- a. If it rains tomorrow, Joe leaves.
- b. # If it rains tomorrow, Joe is always here these days.

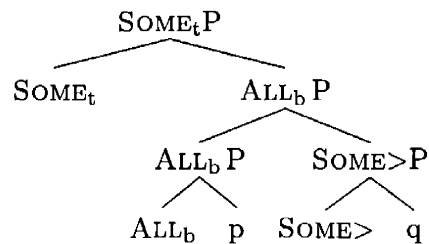
Wide futurates mean something like this: According to what the presupposed director *d* wants, it is already the case that if *p*, *q*. This requires that *q* be the kind of thing that *d* directs. The direction presupposition of the entire conditional would say that if *p*, *d* directs *q*. (I'm not sure how to derive this presupposition.) The reason there is a conditional in the direction presupposition is that if, for example, I am stuck in a snowstorm in Sturbridge and do not have the power now to direct my leaving at 4 unless it should stop snowing before then, I can still truthfully utter (244):

(244) If it stops snowing before then, I'm leaving at 4.

(244) presupposes not that I have the power *now* to determine whether I will leave at 4 or not, but only that I have that power if we only consider the worlds in which it stops snowing.

Modeling the structures on those given for wide *be going to* and *gen-will*, this is what the wide scope readings of PROG and GEN conditionals would look like.

(245) Wide progressive conditional



What we don't know yet from the examples above is whether there is a narrow scope reading of PROG and GEN in conditionals.

The way to find out is to check the other conditional contexts. If there is a narrow reading, relevance and indication contexts should be good regardless of the complement's SIP value. (If there were a complement SIP effect, it would point to only the wide scope reading being possible.) It turns out that PROG and GEN are always good in relevance and indication contexts (whether futurates or not).<sup>19</sup>

<sup>19</sup>A puzzling question is why the wide reading is only possible with bouletic orderings for ALL\_b with GEN and PROG: #If it rains tomorrow, it's snowing tomorrow/it snows tomorrow. Interestingly, wide scope is

- (246) Relevance: progressive has no complement SIP effect
- a. If you want to know, Dave is leaving.
  - b. If you want to know, Dave is being silly now.
- (247) Relevance: generic has no complement SIP effect
- a. If you want to know, Steph leaves tomorrow.
  - b. If you want to know, Steph is always here these days.
- (248) Indication: progressive has no complement SIP effect
- a. If the baby is crying, she is teething.
  - b. If the baby is smiling, she is being a flirt.
- (249) Indication: generic has no complement SIP effect
- a. If Barbara is here, she leaves on Monday.
  - b. If Genevieve is on vacation, she is always at the card table all day long (and that's why she hasn't returned your call.

#### 4.2.4 Summary

Some generalizations from this section: Anything with SIP as the highest predicate in the consequent gets SIP entailment. Bare *will* and “wide scope” anything get the complement SIP effect. When what's left highest in the consequent is +SIP, there is an SIP entailment; if it is -SIP, there is none.

Some conclusions, for the moment:

ALL<sub>b</sub> is transparent to SIP. This gets us the +SIP value for PROG and GEN, and bare *will* + statives, but not bare *will* + eventives. The reason there is no bare *will* + eventive in relevance and indication contexts, I suggested, had to do with the present -SIP constraint; as yet I have not suggested how.

There are two possible structures for bare *will* conditionals (ALL<sub>b</sub> either inside or outside the consequent); we don't yet know if both are possible, or only one. Nor do we know what the conditional modal is for the +SIP futures and the futurates.

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possible with both bouletic and inertial readings for *be going to*: ✓ If it rains, it's (#already) going to snow; ✓ If he says a word I'm (#already) going to yell at him. Note that this is consistent with a general trend that more is possible in inertial *futures* than in inertial *futurates* (It's going to rain tomorrow/#It's raining tomorrow).

To ensure that the mechanism from chapter 3 can work on these structures, I will show that there are two different kinds of temporal interpretation in conditionals, depending on the conditional modal used, and that the mechanism works in either case.

### 4.3 Temporal interpretation of antecedent and consequent

We have seen that if we can get the antecedent TP input and the input to a +SIP predicate in the consequent to be the same, we can use an account quite similar to the narrow *be going to* account to explain the SIP effects. Now I would like to show that the temporal interpretation of antecedents and consequents in conditionals permits this state of affairs.

In order to show this, I will argue that conditionals split into two types with respect to temporal interpretation, depending on what their conditional modal is.

In the first type, *now* is the temporal input to both antecedent and consequent. Thus the antecedent and consequent are not constrained with respect to each other, only to *now*. Modals that yield conditionals of this type include the null epistemic modal and a few other epistemic modals such as *must* and *be possible*.

The second type includes modals such as  $ALL_b$ ,  $SOME_t$  and  $ALL_t$ . In our denotations of these so far their propositional argument had a box relation ( $\boxtimes$ ) to determine the temporal input to the proposition. This proposition was the consequent. We will add a propositional argument that is part of the antecedent; the temporal input of this proposition will also be determined by the box relation. Finally, we will see that the consequent box relation input is the same time as the antecedent box relation output; that is, the time at which *q* occurs has to either overlap or follow the time at which *p* occurs. A great many other modals are in this category.

In the next two sections, I will present evidence for two lemmas which are generalizations about the temporal relation between the clauses in conditionals: Lemma 1 for the first type of conditionals, and Lemma 2 for the second type. Then I will show how the truth of these lemmas entails that the temporal condition on SIP entailments permits the conditions for the SIP entailment to arise in the correct environments.

#### 4.3.1 Lemma 1: Type 1 conditionals

The lemma I will argue for here is the following:

- (250) *Lemma 1:* In type 1 conditionals, the TP input of the antecedent and the TP input of the consequent are both *now*.

I will argue for this lemma by considering conditionals with no overt modal that are not obviously generic or relevance conditionals. The conditional modal in such cases I assume to be a null epistemic modal EP. EP has universal force and an epistemic modal base; in contrast to the circumstantial modal base, this modal base consists of worlds which, for all the speaker knows, could be the actual world. The reader can verify that the other modals mentioned as being in this category have the same temporal properties (and see also Iatridou (1990)).

After arguing for Lemma 1, I will demonstrate that the temporal properties of EP allow the antecedent TP input and the consequent +SIP input to be the same when the +SIP element in question is the highest predicate in the consequent that does not involve an identity relation on times. We may be able to say something about which structure to choose for various conditionals, as well.

Consider first present tense conditionals that lack an overt modal. Lexically stative predicates are possible in both antecedent and consequent.

- (251) If Barbara is here now, Steph is here now too.

However, the run times of these statives have to include *now*, meaning that the input to both statives is *now*. If the speaker intends lexical statives to have run times after now, they need to be futurates. The examples in (252), which respectively have a stative with future run time in the antecedent, consequent, and both, are only acceptable on the reading that the clauses about tomorrow are really talking about present plans for tomorrow.

- (252) a. If Barbara is here tomorrow, Steph is here now.  
b. If Barbara is here now, Steph is here tomorrow.  
c. If Barbara is here tomorrow, Steph is here tomorrow.

An unplannable predicate like *be sick* is not good in either the antecedent or consequent:

- (253) a. # If Barbara is sick tomorrow, Steph is here now.  
b. # If Barbara is here now, Steph is sick tomorrow.  
c. # If Barbara is sick tomorrow, Steph is sick tomorrow too.

Futurates, we have said, are always +SIP. The reason, I argued, is that both PROG and GEN consist of ALL<sub>b</sub>, which we decided was transparent to SIP effects, and below that, either SOME<sub>t</sub> or ALL<sub>t</sub>, and both of those are +SIP. Thus we can say so far that in both clauses, EP seems to require +SIP predicates.<sup>20</sup>

In support of this hypothesis, present eventives in conditionals without overt modals must also be embedded under a +SIP predicate, and any +SIP predicate will do. For example, the conditionals in (254) with the temporal adverbials most naturally get futurate readings; without them, they are generic statements: whenever Tasha is here, Marissa leaves, etc.<sup>21</sup>

- (254) a. If Tasha is here now, Marissa leaves on Friday.  
       b. If Tasha leaves on Friday, Marissa is here now.  
       c. If Tasha leaves on Friday, Marissa leaves on Tuesday.  
       d. If Tasha leaves on Tuesday, Marissa leaves on Monday.

Either statives or eventives can appear under PROG or PAST, both of which are +SIP (again, we ignore any generic readings):

- (255) a. If John is eating, Celeste is eating.  
       b. If John is being nice, Celeste is being nice.  
       c. If Celeste was here, John was here.  
       d. If Celeste left, John left.

Present and past can also be mixed and matched, as in (256).

- (256) a. If Andrea is there now, Celeste left.  
       b. If Andrea left, Celeste is there now.

Note that the run times of the antecedent and consequent are *not* constrained with respect to each other. Suppose that we know Celeste always leaves a party an hour after John does. Then we could utter (257a) in reasoning from the time of John's leaving to the time

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<sup>20</sup>These facts are the reason why, in defining the box relation, I eschewed Condoravdi's (2001) extended-now input. With an input that stretches from now into infinity, it would be difficult to account for cases such as this one that do not allow lexical statives to have future run times.

<sup>21</sup>I assume ALL<sub>t</sub> is the conditional modal for the generics.

of Celeste's leaving. Or if she always leaves a party an hour earlier, we could use (257b). If they always leave together, we could use (257c).

- (257) a. If John left at 5, Celeste left at 6.  
       b. If John left at 6, Celeste left at 5.  
       c. If John left at 6, Celeste left at 6 too.

This relative freedom is in contrast to sequence of tense phenomena, in which the run times of two eventualities (one in the matrix, one embedded) are constrained with respect to one another. With an embedded stative, as in (258) below, the Marissa-being-here time has to either overlap the Tasha-saying-so time, or precede it; (258c) is not good, but improves with a plannable eventuality as in (258d), so again, it can only be a futurate reading.

- (258) a. On Monday Tasha said that Marissa was sick.  
       b. On Monday Tasha said that Marissa was sick on Sunday.  
       c. # On Monday Tasha said that Marissa was sick next week.  
       d. On Monday Tasha said that Marissa was here next week.

So one other thing we can say about epistemic conditionals is that there is no sequence of tense involved.

Since the requirement seems to be that the antecedent and consequent both need to have the subinterval property, and need have no particular relation to each other, we can fairly say that the present -SIP constraint is at work. Thus the input to both the antecedent TP and the consequent TP must be *now*. So, for at least these kinds of epistemic conditionals, QED Lemma 1.

Now, if the TP times are the same, and the highest (temporal) operator in the consequent is +SIP, like PAST, GEN, PROG, or a lexical stative, then we can use the proposed temporal condition on SIP states that there should be a +SIP entailment, which is correct.

### 4.3.2 Lemma 2: Type 2 conditionals

The lemma for this section is as follows.

- (259) *Lemma 2:* In type 2 conditionals, there are box relations in both the antecedent and the consequent. The antecedent box output and the consequent box input (= consequent TP input) are the same.

To begin with, let us see which temporal and stativity combinations are possible in conditionals that have one of these modals, such as bare *will* conditionals.

Like type 1 conditionals, type 2 conditionals can generally have statives whose run times include the present.

(260) If Barbara is here now, Steph will be here now too. (cf. (251))

However, unlike type 1 conditionals, type 2 conditionals can also have statives and eventives, in either the antecedent or the consequent, with run times in the future but which are not futurates. We show this, as usual, by demonstrating that unplannable eventualities are felicitous. (Admittedly the contexts to make some of these good are a little strange.)

(261) (cf. (252))

- a. If Barbara is sick tomorrow, Steph will be sick tomorrow.
- b. If Barbara is sick tomorrow, Steph will be sick now.
- c. If Barbara is sick now, Steph will be sick tomorrow.

So type 2 conditionals, unlike type 1 conditionals, permit future eventualities that are not futurate.

It looks like what we have is the box relation in both the antecedent and the consequent: eventives (-SIP) can have only future run times, but statives (either +SIP or -SIP) can either overlap or follow *now*. Type 1 conditionals, on the other hand, must not have a box relation, because they only allow predicates to overlap *now*. They are slaves to the present -SIP constraint, which says that  $p(w)(now)$  is not permitted for a  $p$  that is -SIP. However, there is no constraint that says you can't feed the box relation a -SIP proposition. for both clauses.

How are the input and output times of the two box relations in a type 2 conditional related? It turns out that in type 2 conditionals, no part of the run time of  $q$  can be before any part of the run time of  $p$  (excluding cases where  $p$  is futurate).

Let's call the situation in which some of the run time of  $q$  is before the run time of  $p$ , "switching". Switching is possible in type 1 conditionals; as we saw above, the run times are not dependent on each other at all. The eventuality described in the consequent can indeed take place before the eventuality described in the consequent. In type 2 conditionals, however, the two run times can overlap if  $q$  is stative, but any attempt to have an



antecedent's run time later than the consequent's run time results in a futurate reading; that is, it behaves like it is a +SIP predicate overlapping *now*, so it really isn't switching at all.

- (262) a. If Celeste leaves tomorrow, John will be in his office now.  
 b. If Celeste leaves on Thursday, John will be in his office tomorrow.

Since, as I argued above, there is also an instance of the box relation operating in the consequent, our first suspicion should be that the box output of *p* is used as the box input for *q* (i.e., the TP time of *q*). In that case *q* could never be before *p* without some sort of anterior operator like PAST.

This seems to be true. For example, the Don-in-office time in (263a) cannot be entirely before 5, but it can either overlap 5 or be entirely after it. In (263b), though, there can be no simultaneity of the lights' coming on and Don's going home; he goes home after, if only slightly.<sup>22</sup>

- (263) a. If the lights are on at 5, Don will be in his office.  
 b. If the lights come on at 5, Don will go home.

This is exactly what we expect if the box output of *p* is the box input for *q* and there is no other temporal/aspectual morphology in *q*. When there is temporal morphology in *q*, such as *have*, the *vP* input of *q* is shifted accordingly. (That is how we know that it is the TP input, not, say, the *vP* input, that is also the box input.) In any case, as expected, the consequent run time is allowed to be earlier.

- (264) If the lights come on at 5, Don will have gone home.

QED Lemma 2, at least for bare *will* conditionals.

Now, to derive what we were aiming at: that this temporal relation between antecedent and consequent allows the SIP entailment condition to arise in type 2 conditionals where the facts show it does.

SIP entailments, we said, should occur when the consequent input to an +SIP predicate is the same as the antecedent TP input. This relation is entailed by the relation in Lemma 2 in a situation where there is a +SIP predicate with no -SIP predicates above it.

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<sup>22</sup>On generic readings this may be different.

Now all we need to do is show that the antecedent TP input is the antecedent box output (as in the consequent, which we justified in chapter 3). We can (and will) define it this way, but let's justify such a move first.

We have seen in the discussion surrounding (263) and (264) that in type 2 conditionals, the consequent TP input is the consequent box output. That is, in the consequent, the box relation takes the TP as its propositional argument. Is the same true in the antecedent? Well, the input of the box relation (the time that the antecedent's input cannot precede) is clearly *now*, the default time, which seems to indicate that it is high. But how high?

It is tantalizingly impossible to get a past in the antecedent of a boulerthial conditional. The only real reading of (265), below, with a bare *will*, is that if and when Don *finds out* the lights came on at 5, he will go home.

(265) ? If the lights came on at 5, Don will go home at 7.

Noam Chomsky (p.c.) pointed out to me that it is possible to say this if Don's habits are well established. But that is only possible with a generic *will*. I suspect this is a type 1 conditional embedding a generic *will*. A bare *will* + eventive consequent would not be able to occur in a type 1 conditional because it is -SIP.

I don't really know what to make of the claim that there can be no PAST in the antecedent of a type 2 conditional. In any case, if we forgo an explanation of the restriction and just concede that it is so, then the box output is the TP input.

Therefore, in type 2 conditionals of the kind we have looked at, we have derived the SIP mechanism in the appropriate situation.

### 4.3.3 Which conditional is which?

All that remains, then, is to confirm that the contexts we looked at in section 4.1 permit either type 1 conditionals, type 2 conditionals, or both.

If they all behave one way or the other (or both), we are done explaining SIP effects.

Consider first the conditional contexts that are incompatible with the SIP entailment; offering and cause. Right away we can say that those cannot be type 1 conditionals and must be type 2 conditionals.

However, contexts that are compatible with the SIP entailment could be either type 1 or 2. We will look at conditionals in relevance and indication contexts, and apply two

tests. If a conditional can have the run time of the consequent precede the run time of the antecedent without resorting to futurates (“switching”), it has a type 1 reading. If it can’t, it does not. If a conditional permits future run times for non-futurates, it has a type 2 reading. If it does not permit future run times for non-futurates, it does not.

Relevance seems to permit both:

- (266) a. If you’re interested, we bought some beer.  
 b. If you do finish early, we’re going to go get some beer.

Indication seems to permit both as well:

- (267) a. If the baby is crying, her brother made a face at her.  
 b. If the baby cries, she’s going to spit up.

But in either type of conditional, we can explain the SIP effects.

#### 4.3.4 Why the SIP value of p doesn’t matter

I have argued for two different kinds of conditionals, each with a different temporal relationship between antecedent and consequent. Type 1 conditionals, I argued, have the same TP input for both the antecedent and the consequent, while in type 2 conditionals, there are box relations in both clauses, and the antecedent box output is the consequent box input. We found that the SIP mechanism could be derived in both cases, which is important because it happens with both type 1 and type 2 conditionals.

We have seen that the SIP value of the consequent certainly has detectable effects on judgments in contexts where it matters whether the not-p worlds are q worlds. But the SIP value of the antecedent never seems to matter. Let’s demonstrate this briefly. Suppose that the antecedent is a lexical stative, and some of its run time precedes the run time of a stative in the consequent. In that case the q worlds are all included among the p worlds (because there is no “overhang” of q on the left as in the cases we have discussed).

Thus in these cases, we expect not to get the SIP entailment. But this is not so; neither with narrow *be going to* nor with statives under *will* and wide *be going to* do we get such judgments with a stative antecedent (such as *If you want* or *If you’re interested*, and so on). The same will be true for +SIP predicates other than lexical statives, as well.

Evidently, then, the run time of the antecedent, even if the antecedent is +SIP, is not allowed to have any part preceding the run time of the consequent. Why? To answer this question, let's consider in turn both types of conditional.

Consider an type 1 conditional. A stative antecedent and stative consequent both have *now* as their TP input (Lemma 1). If there is no intervening temporal/aspectual operator, in principle their run times might be such that some of the run time of *p* precedes the run time of *q*. However, this would not be compatible with the semantics of the conditional itself, as we can see if we apply our mechanism once more. For if some of *p* precedes *q*, some worlds that split off before *q* are *p* worlds, because *p* is stative and therefore has the subinterval property, so all you need is a little bit of *p* in order to be a *p* world. But some of these worlds are not-*q* worlds, because they split off before *q*. Thus not all *p* worlds are *q* worlds, contradicting the semantics of the conditional, which say that all *p* worlds are *q* worlds. So such a case could never arise.

Wait a minute, though. How would this work with a past antecedent? Consider an type 1 conditional with a past stative antecedent, and a present stative consequent, as in (268).

(268) If Marissa was here yesterday, Tasha is here now.

Why couldn't we do the trick here, too, and say that (268) conflicted with the semantics of the conditional? After all, part (actually all) of *p* precedes *q*, and *p* is stative, so it has the subinterval property, therefore any worlds that split off during *p* are *p* worlds, and (typically) some of them are not-*q* worlds. Thus again, not all *p* worlds are *q* worlds, which is not allowed. Yet (268) is a perfectly fine type 1 conditional.

This is because in the direction presupposition, the director directs the future from the perspective of *now* or in intervals including *now*. Any time not overlapping now is therefore settled with respect to the director's desires; they can't change the past even if they want to. We know that counterfactuals have past morphology that takes us back to a past time to do the branching by use of past morphology that affects the perspective of the conditional modal (Iatridou, 2000; Ippolito, 2002). Naturally, without that morphology, we do not expect the branching to be available.

The type 2 case is more straightforward. Since, as per Lemma 2, the antecedent box output is the consequent box input, any stative in the consequent has a run time which is a superinterval of that input time. So the antecedent stative run time (=box output) is

necessarily an internal interval of the consequent stative run time, and so the problem does not arise.

For now, let's formalize.

## 4.4 Formal details

### 4.4.1 Temporal location and aspect

The present -SIP constraint is as follows:

- (269) Present -SIP constraint  
 For all -SIP  $p$ , and for all  $w$ ,  
 $p(w)(now)$  is not defined.

Here is the box relation again, which yields different results according to whether the propositional argument is + or -SIP.

- (270) “ $Qt' \triangleright t: [p(w)(t)]$ ” is an abbreviation for “ $Qt' > t: [p(w)(t')]$ ” if  $p$  is -SIP, and “ $Qt'$  including or later than  $t [p(w)(t')]$ ” if  $p$  is +SIP.

Past tense:

- (271)  $[[PAST]]^g(p)(w)(t) = 1$  iff  $\exists t' < t [p(w)(t')]$

We will assume that present tense is zero.

### 4.4.2 Denotation of EP

Recall Lemma 1, which said that the TP times for both antecedent and consequent are the same, and in fact were both *now*. Only +SIP predicates are allowed, in either clause. This is not consistent with a box relation, which would allow future-oriented predicates. Therefore EP does not introduce any instances of the box relation; a denotation is given in (272).

- (272)  $[[EP]]^g(p)(q)(w)(t) = 1$  iff  $\forall w'$  epistemically<sup>23</sup> accessible from  $w$  at  $t [p(w')(t) \rightarrow q(w')(t)]$

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<sup>23</sup>Certainly there should be someone to do the epistemming. We will not worry about this.

Here is EP with statives, as in (273); the statives must be evaluated *now*.

(273) If Don is here, Barbara is there.

(274)  $\llbracket \text{EP} \rrbracket^g (p_{+SIP})(q_{+SIP})(w)(now) = 1$  iff  
 $\forall w' \text{ accessible from } w \text{ at } now [p_{+SIP}(w')(now) \rightarrow q_{+SIP}(w')(now)]$

Note that EP cannot take any -SIP arguments, because the expression  $p_{-SIP}(w')(now)$  violates the present perfective constraint.

EP can take clauses that have PAST in them, because PAST is +SIP. Even if the predicate under PAST is itself -SIP, that does not matter, because it does not have to take *now* as an input.

(275) If Devon left, Dave is here.

(276)  $\llbracket \text{EP} \rrbracket^g (\llbracket \text{PAST} \rrbracket^g) (p_{-SIP}) (q_{+SIP})(w)(now) = 1$  iff  $\forall w' \text{ accessible from } w \text{ at } now$   
 $\llbracket \llbracket \text{PAST} \rrbracket^g (p_{-SIP})(w')(now) \rightarrow q_{+SIP}(w')(now) \rrbracket = 1$  iff  $\forall w' \text{ accessible from } w \text{ at } now$   
 $[t' < now \ \& \ p_{-SIP}(w')(t') \ \& \ q_{+SIP}(w')(now)]$

The expression  $p_{-SIP}(w)(t')$  does not violate the present perfective constraint, because  $t'$  is not *now*.

#### 4.4.3 Denotations of type 2 modals

In the discussion of Lemma 2 above, we saw evidence that there is an instance of the box relation in each clause. Furthermore, the consequent box input is the antecedent box output.

For  $\text{ALL}_b$  this result is achieved with the following denotation, altered from our earlier denotations only by the insertion of an antecedent, and box relations on the antecedent and consequent, to account for Lemma 2. We could also do the same with the aspectual modals.

(277)  $\text{ALL}_b(d)(p)(q)(w)(t) = 1$  iff  $\forall w'$  metaphysically accessible from  $w$  at  $t$  and maximally consistent with  $d$ 's desires in  $w$  at  $t$ :  $[\exists t' \triangleright t: [p(w')(t')]] \Rightarrow \exists t'' \triangleright t': [q(w')(t)]$   
 Presupposed:  $d$  directs  $p$  in  $w$  at  $t$

## 4.5 Questions about ordering

We have seen that the temporal interpretation of conditionals is such as to permit the mechanism from chapter 3 to explain the SIP complement effect in conditionals.

Two very puzzling questions are worth mentioning before we leave this topic: Why can't a +SIP element in the consequent of narrow *be going to* overlap the present? And why is inertial ordering impossible with wide PROG and wide GEN?

### 4.5.1 Simultaneous states

Apparently, in narrow *be going to*, a +SIP *q* cannot overlap the present. We will have to show this with stative *p* and *q* because of the present -SIP constraint.<sup>24</sup> We will need to check whether statives can both be overlapping the present, or if stative *q* has to be pushed to the future in narrow *be going to*. This seems to be the case, in contrast to *will* and wide *be going to*.

*Will* is easy, it has the “epistemic reading.” Not just the stative in *p*, but also the stative in *q* is allowed to be interpreted *now* (and that is the most natural reading). (Don't yet know if this is bare or generic.)

(278) If Delaney's at a movie right now, she'll be at the Amherst.

*Be going to*, with its two scopal readings, is a little more difficult. At least one reading of *be going to* is fine with a *q now* as well. Suppose we are arguing about where we can find Delaney. I could say:

(279) If Delaney's at a movie right now, she's going to be at the Amherst (because that's her favorite theatre).

But is this *be going to* wide *be going to*, narrow *be going to*, or both? The fact that it is odd with *already* means that it is not narrow *be going to*.<sup>25</sup>

(280) # If Delaney's at a movie right now, she's already going to be at the Amherst.

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<sup>24</sup>Actually, only *q* need be stative; cf. section 4.3.4.

<sup>25</sup>It is possible to have simultaneous states with *already* and *be going to*, but these look like they have a higher GEN or ALL<sub>t</sub> operator (these off the internet): √If you do not live in NYC, it's already going to be tough to help. √If you're a big enough Ruston fan to drive to Shreveport, you're already going to be at games in Ruston.

Therefore the acceptable (278) must be wide *be going to*.

Likewise, verb phrases p and q can also both happen simultaneously in the future with *will*, but not with narrow *be going to*, only with wide *be going to*.

- (281) If Delaney is at a movie when we call her tomorrow, she is (#already) going to be at the Amherst.

With a present futurate in the antecedent and a present stative in the consequent, only *will* is possible. This too supports the idea that narrow *be going to* cannot have overlapping states. Suppose that John Paul's father Jeff has been away on business, and is supposed to get home tomorrow. Also suppose that John Paul wants all his stuffed animals to say hi to his dad when he gets home, and that he has to spend a considerable amount of time coaching them beforehand. With *be going to*, it is not possible to have a conditional with a present futurate antecedent and a stative whose run time includes *now* in the consequent.

- (282) a. If Jeff gets home tomorrow, John Paul will be in his room at the moment getting his stuffed animals ready.  
b. ? If Jeff gets home tomorrow, John Paul is going to be in his room at the moment getting his stuffed animals ready.

However, with a future-oriented stative in the consequent, and thus no simultaneity of states, both *will* and *be going to* are good.

- (283) a. If Jeff gets home tomorrow, John Paul will be in his room when we come by tonight, getting his stuffed animals ready.  
b. If Jeff gets home tomorrow, John Paul is going to be in his room when we come by tonight, getting his stuffed animals ready.

We know that this is narrow *be going to* instead of wide *be going to* because *already* is fine (remember it's the *already be going to* reading, we are interested in, not the *be going to already be* reading):

- (284) If Jeff gets home tomorrow, John Paul is already going to be in his room when we come by tonight, getting his stuffed animals ready.

But with a present state and *at the moment*, *already* is no good, so it must be that the narrow scope reading has been ruled out.



(285) ?? John Paul is already going to be in his room at the moment.

We should note that we can use the possibility for simultaneous states as a test for wide *be going to*: if a *be going to* sentence allows simultaneous states, it allows the wide scope reading. This is an important addition to the *already* test, which only detects the presence of the narrow scope reading. Now, when *already*, and therefore the narrow scope reading, is possible, we can detect whether the wide scope reading is possible too.

Nonetheless I'm not sure why it is so. We could say that there is a null eventive antecedent (call it *r*) as the first argument of narrow *be going to*. Then the run time of the consequent must be future with respect to the box output of *r*, which itself has the same box input as the box output of the overt antecedent (the first argument of *EP*), because *be going to* is +SIP. Thus the consequent has a later run time than the run time of the antecedent.

We still would have to say why there couldn't be a null stative antecedent, and why it seems to be preferred for *be going to* to be low and have a null antecedent (since wide *be going to* is often somewhat difficult to for speakers to get at first).

#### 4.5.2 Wide scope and bouletic ordering

It turns out that the director can only be animate in cases where there is wide scope PROG or GEN. We know it is a bouletic/inertial split rather than a futurate/non-futurate one because (286c) and (287c), both inertial futurates, are bad.

- (286) a. If it rains tomorrow, I'm quitting.  
b. # If it rains tomorrow, it is snowing in Minneapolis.  
c. # If it rains tomorrow, the sun is rising at 5:15 the day after.
- (287) a. If it rains tomorrow, I quit.  
b. # If it rains tomorrow, it snows in Minneapolis.  
c. # If it rains tomorrow, the sun rises at 5:15 the day after.

Are there similar facts for the futures? There is a flavor of threat in sentences such as those in (288), which we might associate with bouletic ordering:

- (288) a. If he doesn't back off, he's going to be sorry.  
 b. If he doesn't back off, he'll be sorry.

That this is a wide scope reading is clear from the fact that *already* is not permitted in the *be going to* version.

- (289) # If he doesn't back off, he's already going to regret leaving.

It is not immediately obvious whether that flavor represents a different reading, or merely something pragmatic. However, there is interesting evidence that the examples in (286) and (288) are incompatible with properties of generics. As shown in (290) and (291), donkey pronouns on indefinites are not possible in these cases.

- (290) a. ?? If a man owns a donkey, he's taking it to the fair tomorrow.  
 b. If a man owns a donkey, he takes it to the fair tomorrow. (?? on bouletic reading)
- (291) a. If a man doesn't back off, he's going to be sorry. no generic and threat  
 b. If a man doesn't back off, he'll be sorry. no generic and threat?

But donkey pronouns are possible in other cases, such as (292).

- (292) If a man isn't working, he's (#already) going to be depressed when the holidays roll around.

I leave these puzzling facts for further research.

## Chapter 5

# Conclusion

*Willow*: I think I'm gonna go.  
*Vampire*: Is that what you think?

-*Buffy the Vampire Slayer*,  
"Welcome to the Hellmouth," 1997

The ultimate goal of the research project begun in this dissertation is to better understand the means of future reference available to the human language faculty, by determining, in as many genetically and geographically diverse languages as possible, the meanings of constructions that refer to the future. What was presented here was a semantic theory of four English constructions which are used to speak with a high level of confidence about the future. This theory provided explanations for various facts, raising various questions in the process.

### 5.1 Facts explained

The meaning of futurates and futures, it was argued, involves an aspectual modal on top of a "boulertial" modal, on top of another aspectual modal. The higher aspectual modal has detectable effects on the boulertial modality.

## 5.2 Remaining questions

A number of questions still remain. How should the subinterval property be represented, if not with event arguments? What is the precise characterization of the differences between futurates and futures? Between generic and progressive futurates? What principles account for where aspectual operators can appear in the structure of the clause? When must an agent be a director? Could the box function be the only possible temporal relation? Are the aspectual and modal components of futures and futurates utilized in the denotations of other modals? Is the “actual” future a single future, or branching?

Perhaps most importantly, to what extent do other languages behave as English does? We saw in chapter 4 that the null epistemic modal EP cannot refer to the future. This is true of epistemic modals in general (see Iatridou (1990) for more discussion):

- (293) a. # If it doesn't rain tomorrow, the Red Sox must win.  
b. # If it doesn't rain tomorrow, it is possible that the Red Sox win.

Epistemic modals cannot refer to the future, and, as we saw, the modality of futures and futurates is apparently not epistemic. However, in other languages, it is not clear that we can make such a statement. Japanese uses the same modal for future, unplannable eventualities as it does to express epistemic indeterminacy about the past or present:

- (294) Japanese
- a. Ashita Tokyo-ni iku (#deshoo).  
tomorrow Tokyo-to go probably  
'Tomorrow I (will?) go to Tokyo.'
- b. Ashita ame furu #(deshoo).  
tomorrow rain fall probably  
'Tomorrow it will rain.'
- (295) a. Tanaka-ga iru deshoo.  
Tanaka-nom be probably  
'Tanaka is probably there.'
- b. Tanaka-ga itta deshoo.  
Tanaka-nom be-past probably  
'Tanaka was probably there.'

Thus it is premature to conclude that the only way to talk about the future is the means whose outline we have begun to faintly distinguish here; something quite different could be at work in Japanese.

This is where I normally would say that I will have to leave these questions for future research. But since future research is what I have been doing all this time, I suppose I will have to leave these questions for future future research.

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